



SPICER®

Off-Highway Products

Service Manual

Powershift Transmission
18000 Series HR 4 & 6-Speed
Intermediate Drop

TSM-0035
December 1996

TOWING OR PUSHING

Before towing the vehicle, be sure to lift the rear wheels off the ground or disconnect the driveline to avoid damage to the transmission during towing.



Note: If the transmission has 4 wheel drive, disconnect both front and rear drivelines. Because of the design of the hydraulic system, the engine cannot be started by pushing or towing.

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FOREWORD

This manual has been prepared to provide the customer and the maintenance personnel with information and instructions on the maintenance and repair of the **CLARK-HURTH COMPONENTS** product.

Extreme care has been exercised in the design, selection of materials, and manufacturing of these units. The slight outlay in personal attention and cost required to provide regular and proper lubrication, inspection at stated intervals, and such adjustments as may be indicated will be reimbursed many times in low cost operation and trouble free service.

In order to become familiar with the various parts of the product, its principle of operation, troubleshooting, and adjustments, it is urged that the mechanic study the instructions in this manual carefully and use it as a reference when performing maintenance and repair operations.

Whenever repair or replacement of component parts is required, only **Clark-Hurth Components**-approved parts as listed in the applicable parts manual should be used. Use of "will-fit" or non-approved parts may endanger proper operation and performance of the equipment. **Clark-Hurth Components** does not warrant repair or replacement parts, nor failures resulting from the use of parts which are not supplied by or approved by **Clark-Hurth Components**.



Important: Always furnish the Distributor with the serial and model number when ordering parts.

SAFETY PRECAUTIONS

To reduce the chance of personal injury and/or property damage, the following instruction must be carefully observed.

Proper service and repair are important to the safety of the service technician and the safe, reliable operation of the machine. If replacement parts are required the part must be replaced with one of the same part number or with a equivalent part. Do not use a replacement part of lesser quality.

The service procedures recommended in this manual are effective methods of performing service and repair. Some of these procedures require the use of tools specifically designed for the purpose.

Accordingly, anyone who intends to use a replacement part, service procedure or tool, which is not recommended by Clark-Hurth, must first determine that neither his safety nor the safe operation of the machine will be jeopardized by the replacement part, service procedure or tool selected.

It is important to note that this manual contains various 'Cautions' and 'Notices' that must be carefully observed in order to reduce the risk of personal injury during service or repair, or the possibility that improper service or repair may damage the unit or render it unsafe. It is also important to understand that these 'Cautions' and 'Notices' are not exhaustive, because it is impossible to warn of all the possible hazardous consequences that might result from failure to follow these instructions.

CLEANING AND INSPECTION

CLEANING

Clean all parts thoroughly using solvent type cleaning fluid. It is recommended that parts be immersed in cleaning fluid and moved up and down slowly until all old lubricant and foreign material is dissolved and parts are thoroughly cleaned.



CAUTION: Care should be exercised to avoid skin rashes, fire hazards, and inhalation of vapours when using solvent type cleaners.

BEARINGS

Remove bearings from cleaning fluid and strike flat against a block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning fluid to flush out particles. Repeat above operation until bearings are thoroughly clean. Dry bearings using moisture-free compressed air. Be careful to direct air stream across bearing to avoid spinning. Do not spin bearings when drying. Bearings may be rotated slowly by hand to facilitate drying process.

HOUSINGS

Clean interior and exterior of housings, bearing caps, etc., thoroughly. Cast parts may be cleaned in hot solution tanks with mild alkali solutions. Parts should remain in solution long enough to be thoroughly cleaned and heated. This will aid the evaporation of the cleaning solution and rinse water. Parts cleaned in solution tanks must be thoroughly rinsed with clean water to remove all traces of alkali. Cast parts may also be cleaned with steam cleaner.



CAUTION: Care should be exercised to avoid inhalation of vapours and skin rashes when using alkali cleaners.

All parts cleaned must be thoroughly dried immediately by using moisture-free compressed air or soft, lintless absorbent wiping rags free of abrasive materials such as metal fillings, contaminated oil, or lapping compound.

INSPECTION

The importance of careful and thorough inspection of all parts cannot be overstressed. Replacement of all parts showing indication of wear or stress will eliminate costly and avoidable failures at a later date.

BEARINGS

Carefully inspect all rollers: cages and cups for wear, chipping, or nicks to determine fitness of bearings for further use. Do not replace a bearing cone or cup individually without replacing the mating cup or cone at the same time. After inspection, dip bearings in Automatic Transmission Fluid and wrap in clean lintless cloth or paper to protect them until installed.

OIL SEALS, GASKETS, ETC.

Replacement of spring load oil seals, "O" rings, metal sealing rings, gaskets, and snap rings is more economical when unit is disassembled than premature overhaul to replace these parts at a future time. Further loss of lubricant through a worn seal may result in failure of other more expensive parts of the assembly. Sealing members should be handled carefully, particularly when being installed. Cutting, scratching, or curling under of lip of seal seriously impairs its efficiency. When assembling new metal type sealing rings, same should be lubricated with coat of chassis grease to stabilize rings in their grooves for ease of assembly of mating members. Lubricate all "O" rings and seals with recommended type Automatic Transmission Fluid before assembly.

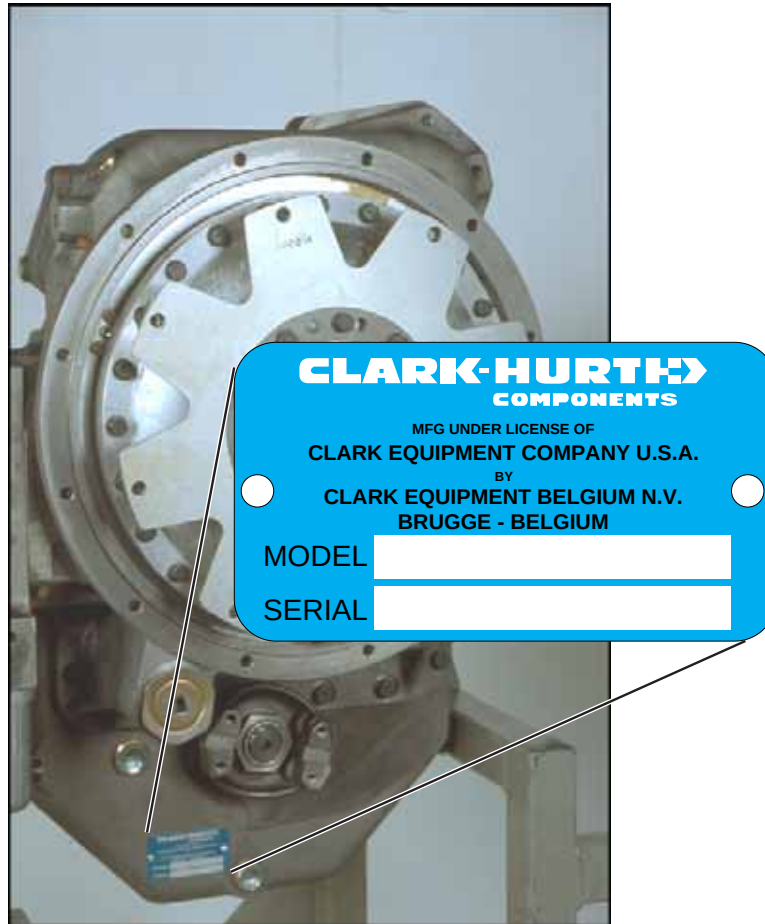
GEARS AND SHAFTS

If magna-flux process is available, use process to check parts. Examine teeth on all gears carefully for wear, pitting, chipping, nicks, cracks, or scores. If gear teeth show spots where case hardening is worn through or cracked, replace with new gear. Small nicks may be removed with suitable hone. Inspect shafts and quills to make certain they are not sprung, bent, or splines twisted, and that shafts are true.

HOUSING, COVERS, ETC.

Inspect housings, covers and bearing caps to be certain they are thoroughly clean and that mating surfaces, bearing bores, etc., are free from nicks or burrs. Check all parts carefully for evidence of cracks or condition which would cause subsequent oil leaks or failures.

TECHNICAL SPECIFICATIONS



A. IDENTIFICATION OF THE UNIT

1. Model and type of the unit
2. Serial number

B. WEIGHT, DIMENSIONS, OIL CAPACITY

Weight (dry)	:	308 Kg.	(678 lb)
Maximum length	:	726 mm	(28,6")
Maximum width	:	542 mm	(21,3")
Maximum height	:	705 mm	(27,8")

Oil capacity:

24 L (6,3 US Gallon) without cooler and hydraulic lines.

Consult operator's manual on applicable machine for system capacity

C. SPECIFICATIONS AND SERVICE DATA**Converter out pressure**

Converter outlet temperature: 180 - 200 F. (82,3° - 93,3° C).

Transmission in NEUTRAL.

25 P.S.I. (172,4 kPa) minimum pressure at 2000 R.P.M. engine speed AND a maximum of 70 P.S.I. (482,6 kPa) outlet pressure with engine operating at no-load governed speed.

Controls

Forward and Reverse : Electric

Speed Selection : Electric

Clutch type : Multiple discs. hydraulically actuated, spring released automatic wear compensation and no adjustment. All clutches oil cooled and lubricated.

Clutch inner disc

Friction.

Clutch outer disc

Steel.

Oil filtration

Full flow filter safety by-pass, also strainer screen in sump at bottom of transmission case.

Clutch pressure

180-220 psi (1241,1 - 1516,8 kPa) - With parking brake set (see note), oil temperature 180 - 200 F. (82,2° - 93,3° C), engine at idle (400 to 600 RPM. shift thru direction and speed clutches. All clutch pressure must be equal within 5 psi, (34,5 kPa). If clutch pressure varies in any one clutch more than 5 psi, (34,5 kPa) repair clutch.



NOTE: Never use service brakes while making clutch pressure checks. Units having brake actuated declutching in forward and/or reverse will not give a true reading.
ALWAYS USE PARKING BRAKE WHEN MAKING CLUTCH PRESSURE CHECKS.

Technical specifications

D. LUBRICATION

Type of oil : See Lube Chart

Capacity : Consult Operator's Manual on applicable machine model for system capacity. Torque Converter, Transmission and allied hydraulic system must be considered as a whole to determine capacity.

Check period : Check oil level daily with engine running at 500-600 RPM and oil at 180 to 200 F. (82,2 - 93,3 C). Maintain oil level to FULL mark.

Normal drain period : Every 500 hours, change oil filter element. Every 1000 hours, drain and refill system as follows: Drain with oil at 180 to 200 F. (65,6 - 93,3° C).

- (a) Drain transmission.
 - (b) Drain oil filters, remove and discard filter elements. Clean filter shells and install new elements.
 - (c) Refill transmission to LOW mark.
 - (d) Run engine at 500-600 RPM to prime converter and lines.
 - (e) Recheck level with engine running at 500 - 600 RPM and add oil to bring level to LOW mark.
- When oil temperature is hot (180-200 F.) (82,2° -93,3° C) make final oil level check.
BRING OIL LEVEL TO FULL MARK.

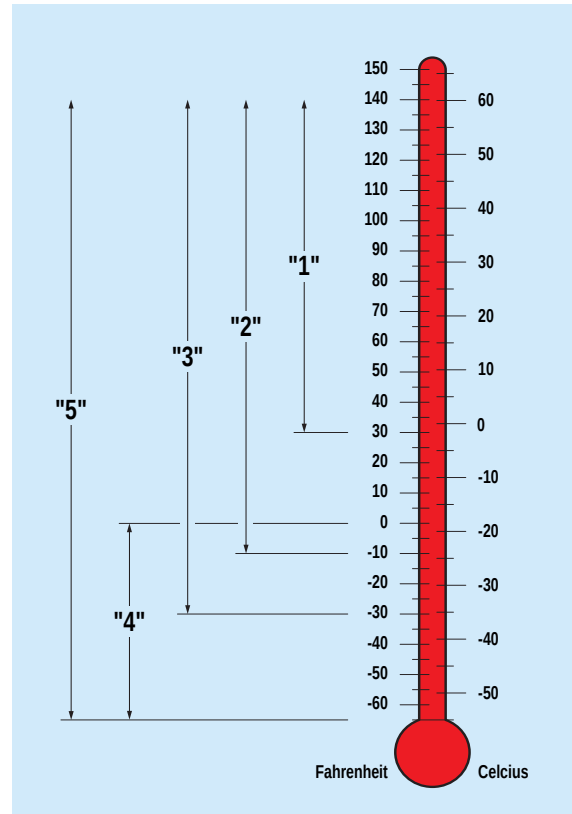


NOTE: It is recommended that filter elements be changed after 50 and 100 hours of operation on new and rebuilt or repaired units.

Recommended lubricants

Prevailing Ambient Temperature

- Temperature Range "1"
 - (a) C-2 Grade 30
 - (b) C-3 Grade 30
 - (c) Engine oil: Grade 30 API-CD/SE or CD/SF
 - (d) MIL-L-2104C-Grade 30
 - (e) MIL-L-2104D-Grade 30
- Temperature Range "2"
 - (a) MIL-L-2104C-Grade 10
 - (b) MIL-L-2104-Grade 10
 - (c) C-2 Grade 10
 - (d) C-3 Grade 10
 - (e) Engine Oil:-Grade 10 API-CD/SE or CD/SF
 - (f) Quintolubric 822-220
(Non Phosphate Ester Fire Resistant Fluid)
- Temperature Range "3"
 - (a) *Dexron
 - (b) Dexron II S - See Caution Below
- Temperature Range "4"
 - (a) Mil-L-46167
 - (b) MIL-L-46167 A
- Temperature Range "5"
 - (a) Conoco high-performance Synthetic Motor Oil Spec. No. 6718



Technical specifications

Preferred oil viscosity

Select highest oil viscosity compatible with prevailing temperatures and oil application chart. Temperature ranges "2" and "3" may be used to lower ambient temperatures when sump preheaters are used. Temperature range "4" should be used only in ambient temperature range shown.

Modulated shift transmissions

T12000, 18000, 24000, 28000 & 32000 series transmissions with modulated shift use only C-3 or temperature range 3 items (a) & (b) * Dexron or *Dexron II D. SEE CAUTION BELOW. 3000, 4000, 5000, 6000, 8000, 16000 & 34000 series transmissions with modulated shift use only C-3 or temperature range 3 item (a) only *Dexron. Do NOT use *Dexron II D. SEE CAUTION BELOW.



CAUTION: *Dexron II D is not compatible with graphitic clutch plate friction material UNLESS IT MEETS THE APPROVED C-3 SPECIFICATIONS. *Dexron II D cannot be used in the 3000, 4000, 5000, 6000, 8000, 16000 or 34000 series power shift transmissions, or the HR28000 & HR32000 series having converter lock-up, or the C270 series converter having lock-up UNLESS IT MEETS THE APPROVED C-3 SPECIFICATIONS.

Any deviation from this chart must have written approval from the application department of the Clark-Hurth Components Engineering and Marketing Department.

- * Normal drain periods and filter change intervals are for average environmental and duty-cycle conditions.
Severe or sustained high operating temperatures or very dusty atmospheric conditions will cause accelerated deterioration and contamination. For extreme conditions judgment must be used to determine the required change intervals

MAINTENANCE

Servicing machine after components overhaul

The transmission, torque converter, and its allied hydraulic system are important links in the driveline between the engine and the wheels. The proper operation of either unit depends greatly on the condition and operation of the other; therefore, whenever repair or overhaul of one unit is performed, the balance of the system must be considered before the job can be considered complete.

After the overhauled or repaired transmission has been installed in the machine, the oil cooler, and connecting hydraulic system must be thoroughly cleaned. This can be accomplished in several manners and a degree of judgement must be exercised as to the method employed.

The following are considered the minimum steps to be taken:

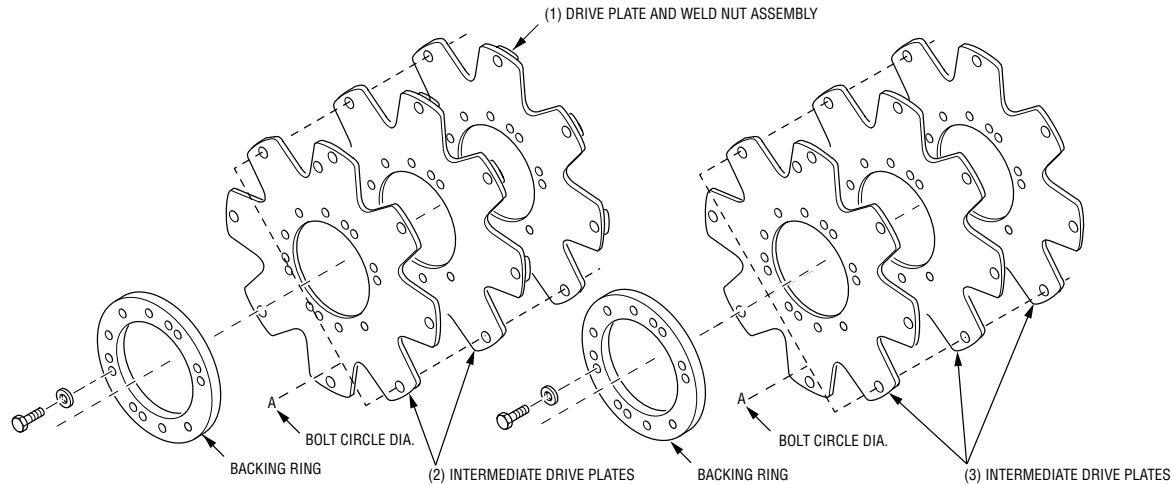
1. Drain entire system thoroughly.
2. Disconnect and clean all hydraulic lines. Where feasible hydraulic lines should be removed from machine for cleaning.
3. Replace oil filter elements cleaning out filter cases thoroughly.
4. The oil cooler must be thoroughly cleaned. The cooler should be "back flushed" with oil and compressed air until all foreign material has been removed. Flushing in direction of normal oil flow will not adequately clean the cooler. If necessary, cooler assembly should be removed from machine for cleaning, using oil, compressed air, and steam cleaner for that purpose. **DO NOT** use flushing compounds for cleaning purposes.
5. Reassemble all components and use only type oil recommended in lubrication section.
Fill transmission through filler opening until fluid comes up to **LOW** mark on transmission dipstick.
Run engine two minutes at 500-600 RPM to prime torque converter and hydraulic lines.
Recheck level of fluid in transmission with engine running at idle (500-600 RPM).
Add quantity necessary to bring fluid level to **LOW** mark on dipstick.
Recheck with hot oil (180-200 F) (82, 2-93, 3° C).
Bring oil level to **FULL** mark on dipstick.
6. Recheck all drain plugs, lines, connections, etc., for leaks and tighten where necessary.

INSTALLATION DETAILS

A. CONVERTER DRIVE COUPLING

Measure the “A” dimension (bolt circle diameter) and order drive plate kit listed below.

Note two (4) kits have (2) intermediate drive plates and one (1) drive plate and weld nut assembly. Two (2) kits with three intermediate drive plates.



“A” Dimension (Bolt circle diameter)

- 11.38" (238,900 mm) diameter
Kit No. 802229
- 13.12" (333,375 mm) diameter
Kit No. 802230
- 13.150" (342,900 mm) diameter
Kit No. 802231
- 17.00" (3431,800 mm) diameter
Kit No. 802356

Each kit will include the following parts:

- 2 Intermediate drive plates
- 1 Drive plate and weld nut assembly
- 1 Backing ring
- 10 Screw and lockwasher assembly
- 1 Instruction sheet

“A” Dimension (Bolt circle diameter)

- 11.38" (288,900 mm) diameter
Kit No. 802494
- 13.12" (333,375 mm) diameter
Kit No. 802393
- 13.50" (342,900 mm) diameter
Kit No. 802232

Each Kit will include the following parts:

- 3 Intermediate drive plates
- 1 Backing ring
- 10 Screw and lockwasher assembly
- 1 Instruction sheet

Position drive plate and weld nut assembly on impeller cover with weld nuts toward converter. Align intermediate drive plates and backing ring with holes in impeller cover.



Note: Two dimples 180° apart in backing ring must be out (Toward the engine flywheel). Install capscrews and washers. Tighten (23 to 25 lbf-ft) torque 31,2 - 33,8 Nm.

B. TRANSMISSION TO ENGINE INSTALLATION PROCEDURE

1. Remove all burrs from flywheel mounting face and nose pilot bore. Clean drive plate surface with solvent.
2. Check engine flywheel & housing for conformance to standard SAE No. 3 per SAE J927 and J1033 tolerance specifications for pilot bore size, pilot bore runout and mounting face flatness. Measure and record engine crankshaft end play.
3. Install two (2.50) 63,500 mm long transmission to flywheel housing guide studs in the engine flywheel housing as shown. Rotate the engine flywheel to align a drive plate mounting screw hole with the flywheel housing access hole.

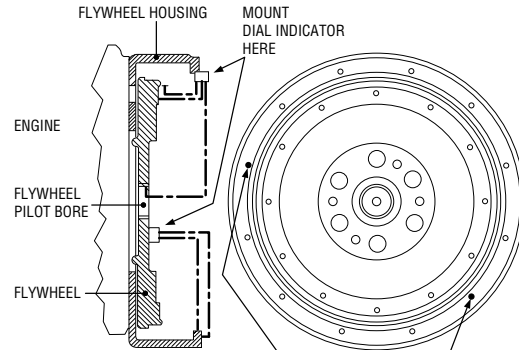


FIG. 1

- *4. Install a (4.00) 101,60 mm long drive plate locating stud .3750 - 24 fine thread in a drive plate nut. Align the locating stud in the drive plate with the flywheel drive plate mounting screw hole positioned in step No. 3.
5. Locate transmission on flywheel housing aligning drive plate to flywheel and transmission to flywheel housing. Note: Fig. 4 installation, align drive plate holes with flywheel studs.

Install transmission to flywheel housing screws. Tighten screws to specified torque. Remove transmission to engine guide studs. Install remaining screws and tighten to specified torque.

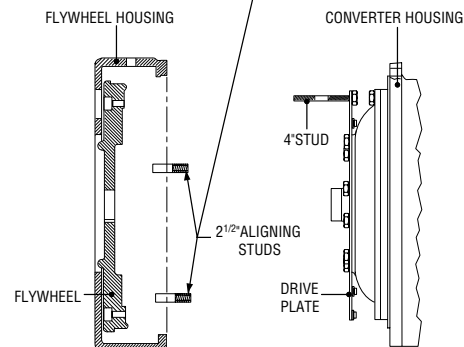


FIG. 2

- *6. Remove drive plate locating stud.
7. Install drive plate attaching screw and washer. Snug screw but **do not tighten**. Note: Fig 4 installation, install drive plate attaching washers and nuts. Tighten each nut 28 to 30 ft. lbs. torque (38.0 - 40.6 Nm) Some engine flywheel housings have a hole located on the flywheel housing circumference in line with the drive plate screw access hole. A screwdriver or pry bar used to hold the drive plate against the flywheel will facilitate installation of the drive plate screws. Rotate the engine flywheel and install the remaining seven (7) flywheel to drive plate attaching screws. Snug screws but do not tighten. After all eight (8) screws are installed torque one (25 to 30) lbf. ft torque 33.9 - 40.6 Nm. This will require tightening each screw and rotating the engine flywheel until the full amount of eight (8) screws have been tightened to specified torque.

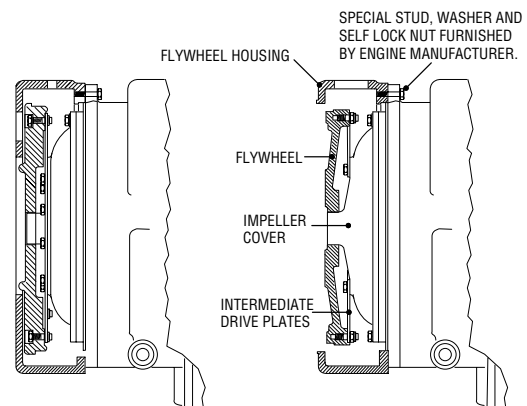


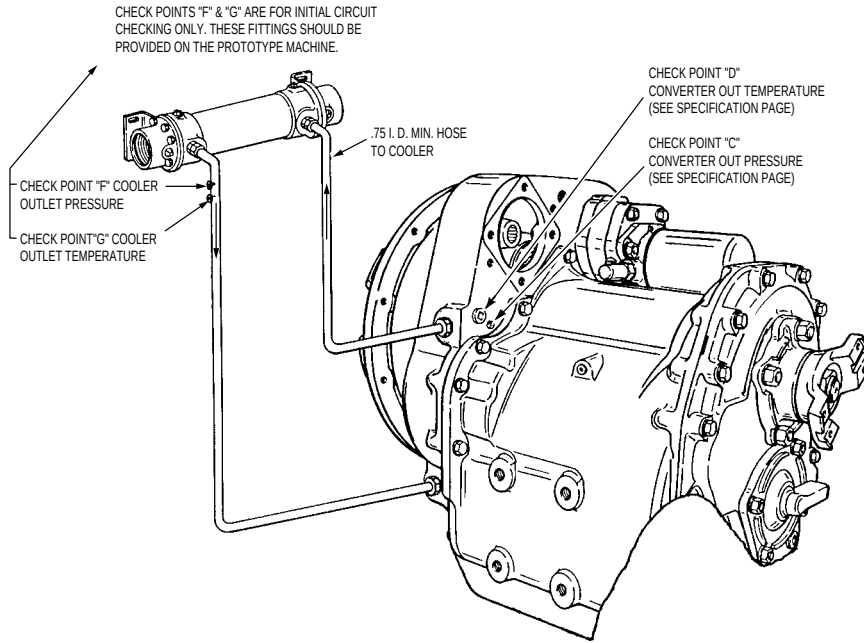
FIG. 3

FIG. 4

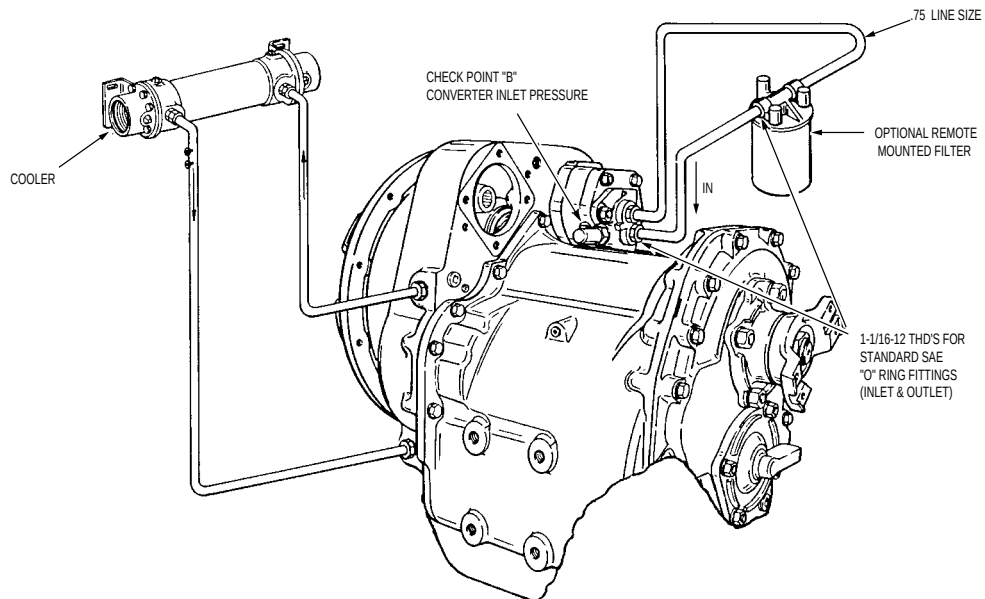
8. Measure engine crankshaft end play after transmission has been completely installed on engine flywheel. This value must be within (.001) 0,025 mm of the end play recorded in step No. 2.

* Does not apply to units having 3 intermediate drive plates. (See fig. 4)

C. EXTERNAL PLUMBING



18000 PLUMBING DIAGRAM

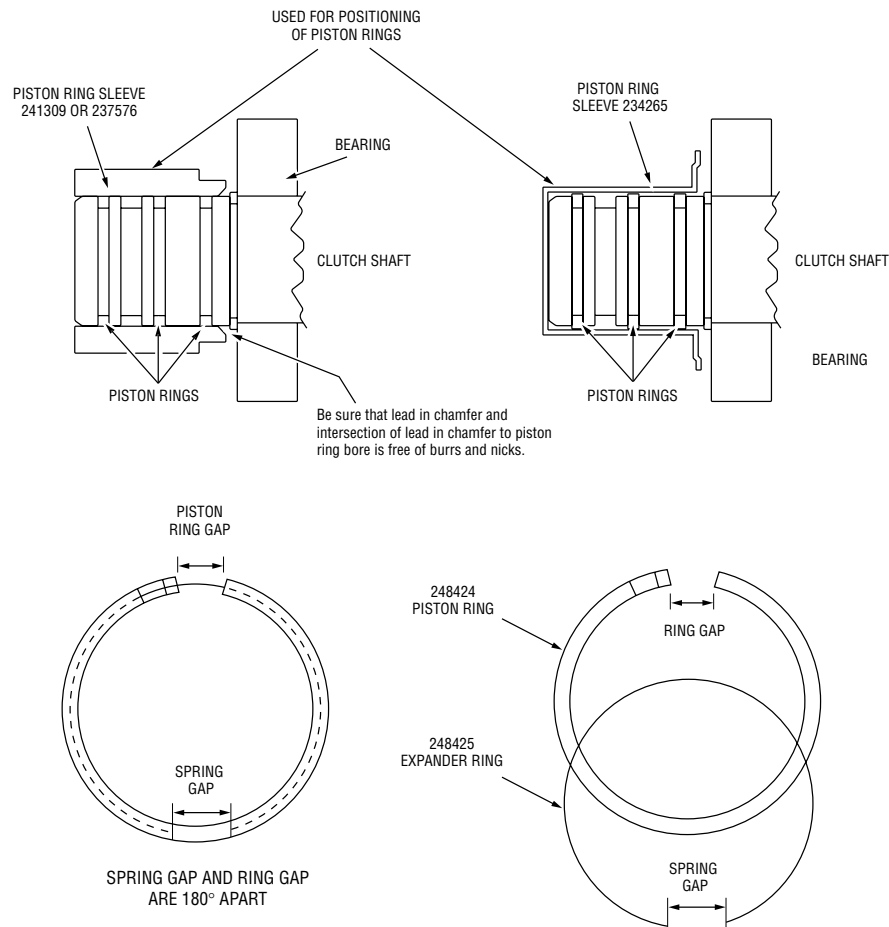


18000 PLUMBING DIAGRAM
(WITH REMOTE FILTER)

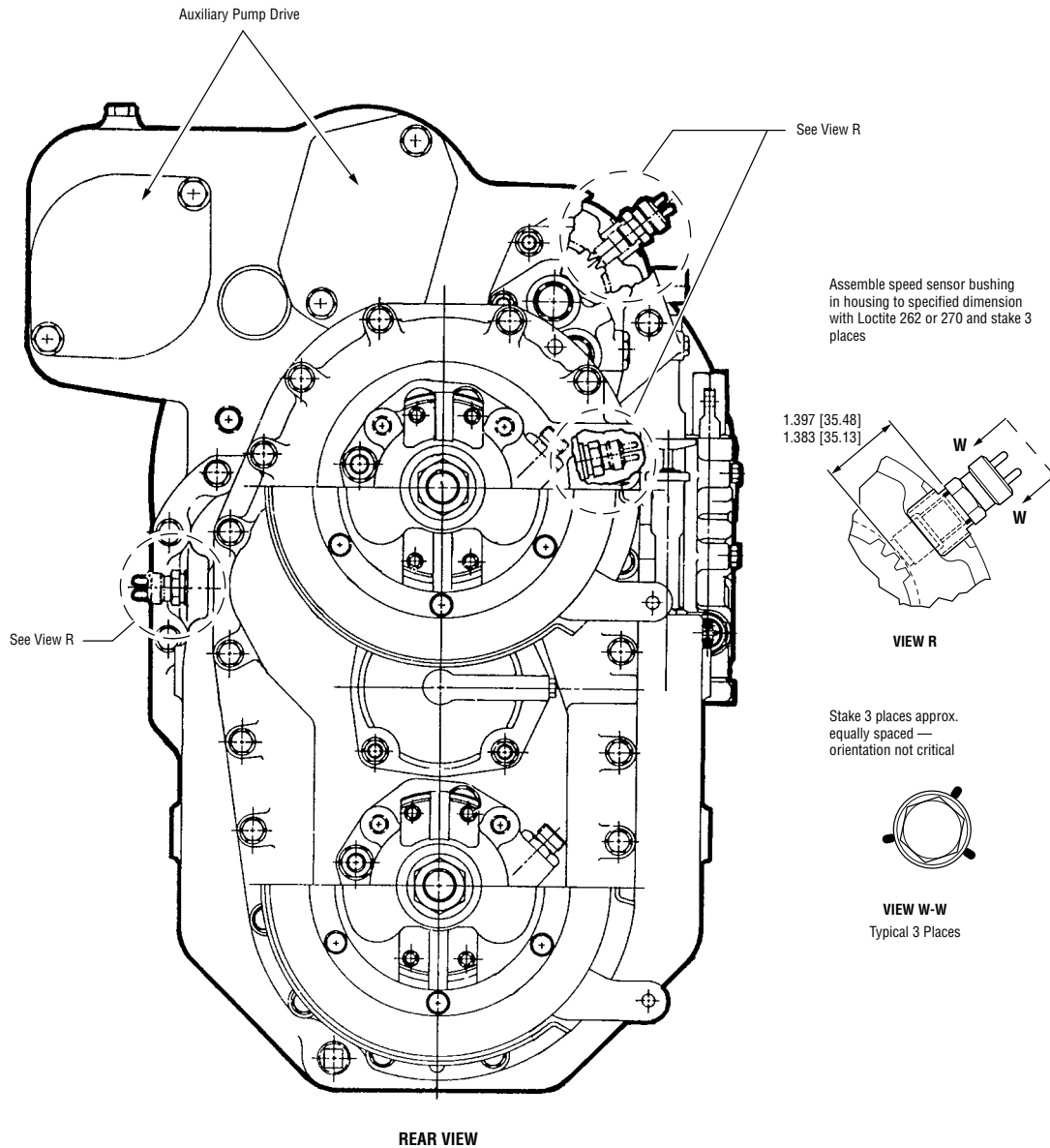
D. PROPER INSTALLATION OF TEFLON PISTON RING AND PISTON RING EXPANDER SPRINGS

Note: Not all transmissions will have teflon piston rings and expander springs

1. Fill the oil sealing ring grooves with a good grade of grease, this will help stabilize the teflon ring and expander spring in the ring groove for installation.
2. Position the expander spring in the inner groove of the new piston ring, with the expander spring gap 180° from the hook joint gap of the piston ring.
3. Carefully position the piston ring and expander spring on the clutch shaft in the inner most ring groove.
Hook the piston ring joint.
4. Repeat steps 1, 2 and 3 for the remaining ring or rings making certain all hook joints are fastened securely.
5. Apply a heavy coat of grease to the outer diameter of the rings and clutch shaft.
Center the piston ring's in the ring groove.
6. Before installing the clutch assembly in the front cover or converter housing it is recommended a piston ring sleeve P/N's 241309, 237576 or 234265 be used to center all of the piston rings in their respective ring grooves. Use extreme caution to not damage piston rings when installing the clutch shaft in the front transmission cover or converter housing.



E. SPEED SENSOR INSTALLATION



OPERATION OF THE UNIT

The transmission and hydraulic torque portion of the power train enacts an important role in transmitting engine power to the driving wheels. In order to properly maintain and service these units it is important to first understand their function and how they operate.

The transmission and torque converter function together and operate through a common hydraulic system.

It is necessary to consider both units in the study of their function and operation.

The Hr model consists of a torque converter and powershifted transmission in one package mounted directly to the engine.

The shift control valve assembly is mounted directly on the side of the converter housing. The function of the control valve assembly is to direct oil under pressure to the desired directional and speed clutch. A provision is made on certain models to neutralize the transmission when the brakes are applied. This is accomplished through use of a brake actuated shutoff valve. The speed and direction clutch assemblies are mounted inside the transmission case and are connected to the output shaft of the converter by direct gearing. The purpose of the speed or directional clutches is to direct the power flow through the gear train to provide the desired speed range and direction.

With the engine running, the converter charging pump draws oil from the transmission sump through the removable oil suction screen and directs it through the pressure regulating valve and oil filter.

The pressure regulating valve maintains pressure to the transmission control cover for actuating the direction and speed clutches. This requires a small portion of the total volume of oil used in the system. The remaining volume of oil is directed through the torque converter circuit to the oil cooler and returns to the transmission for positive lubrication. This regulator valve consists of a hardened valve spool operating in a closely fitted bore. The valve spool is spring loaded to hold the valve in a closed position.

When a specific pressure is achieved, the valve spool works against the spring until a port is exposed along the side of the bore. This sequence of events provides the proper system pressure.

After entering the converter housing the oil is directed through the stator support to the converter blade cavity and exits in the passage between the turbine shaft and converter support. The oil then flows out of the converter to the oil cooler. After leaving the cooler, the oil is directed to a lubrication fitting on the transmission and through a series of tubes and passages lubricates the transmission bearings and clutches. The oil then gravity drains to the transmission sump.

The hydraulic torque converter consists basically of three elements and their related parts to multiply engine torque. The engine power is transmitted from the engine flywheel to the impeller element through the impeller cover.

This element is the pump portion of the hydraulic torque converter and is the primary component which starts the oil flowing to the other components which results in torque multiplication. This element can be compared to a centrifugal pump in that it picks up fluid at its center and discharges at its outer diameter.

The torque converter turbine is mounted opposite the impeller and is connected to the output shaft of the torque converter. This element receives fluid at its outer diameter and discharges at its center. Fluid directed by the impeller out into the particular design of blading in the turbine and reaction member is the means by which the hydraulic torque converter multiplies torque.

The reaction member of the torque converter is located between and at the center of inner diameters of the impeller and turbine elements. Its function is to take the fluid which is exhausting from the inner portion of the turbine and change its direction to allow correct entry for recirculation into the impeller element.

The torque converter will multiply engine torque to its designed maximum multiplication ratio when the output shaft is at zero RPM. Therefore, we can say that as the output shaft is decreasing in speed the torque multiplication is increasing.

Operation of the unit

The shift control valve assembly consists of a valve body with selector valve spools which are activated by solenoids.

With the engine running and the directional control lever in neutral position, oil pressure from the regulating valve is blocked at the control valve, and the transmission is in neutral. Movement of the forward and reverse spool will direct oil, under pressure to either the forward or reverse direction clutch as desired.

When either directional clutch is selected the opposite clutch is relieved of pressure and vents back through the direction selector spool. The same procedure is used in the speed selector 3. The direction or speed clutch assembly

The direction or speed clutch assembly consists of a drum with internal splines and a bore to receive a hydraulically actuated piston. The piston is "oil tight" by the use of sealing rings. A steel disc with external splines is inserted into the drum and rests against the piston. Next, a friction disc with splines at the inner diameter is inserted. Discs are alternated until the required total is achieved. A heavy back-up plate is then inserted and secured with a snap ring. A hub with O.D. splines is inserted into the splines of discs with teeth on the inner diameter. The discs and hub are free to increase in speed or rotate in the opposite direction as long as no pressure is present in that specific clutch.

To engage the clutch, as previously stated, the control valve is placed in the desired position. This allows oil under pressure to flow from the control valve, through a passageway, to a chosen clutch shaft. This shaft has a drilled passageway for oil under pressure to enter the shaft. Oil pressure sealing rings are located on the clutch shaft. These rings direct oil under pressure to a desired clutch. Pressure of the oil forces the piston and discs against the heavy back-up plate. The discs, with teeth on the outer diameter, clamping against discs with teeth on the inner diameter, enables the hub and clutch shaft to be locked together and allows them to drive as a unit.

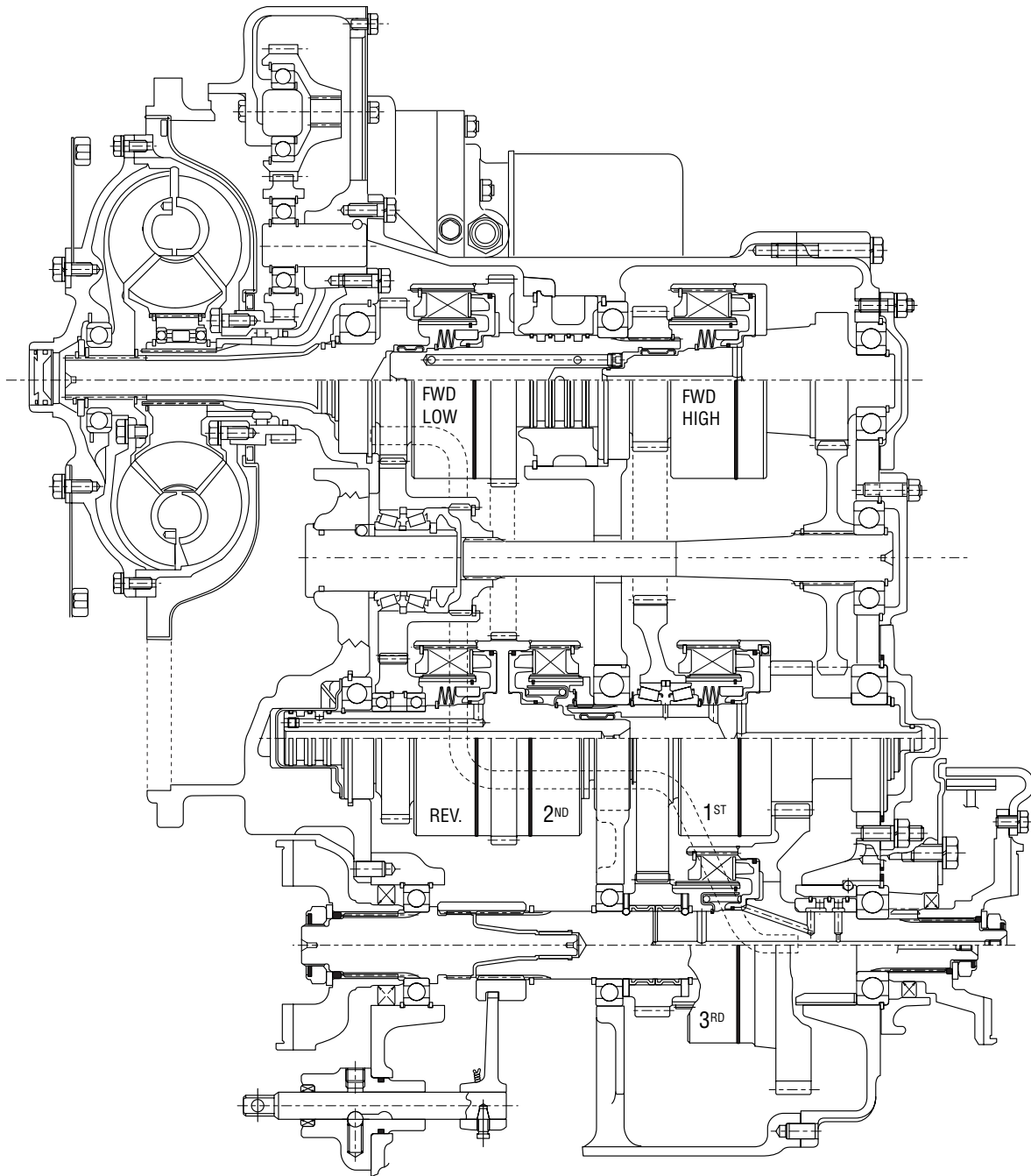
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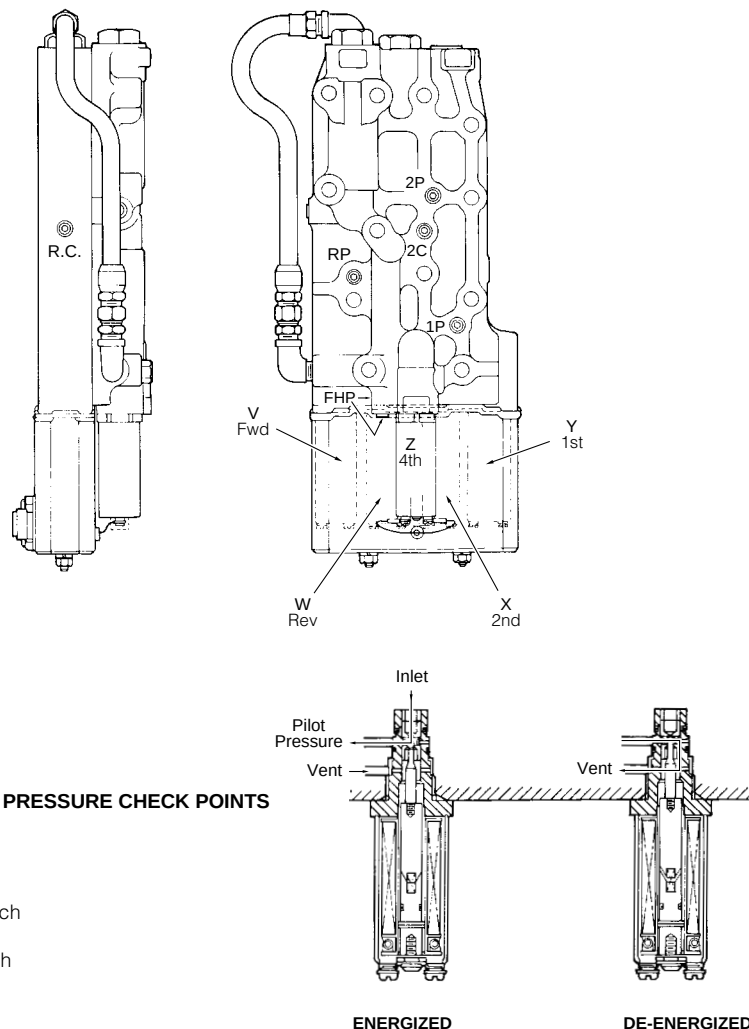
BASIC DESIGN-HR MODEL



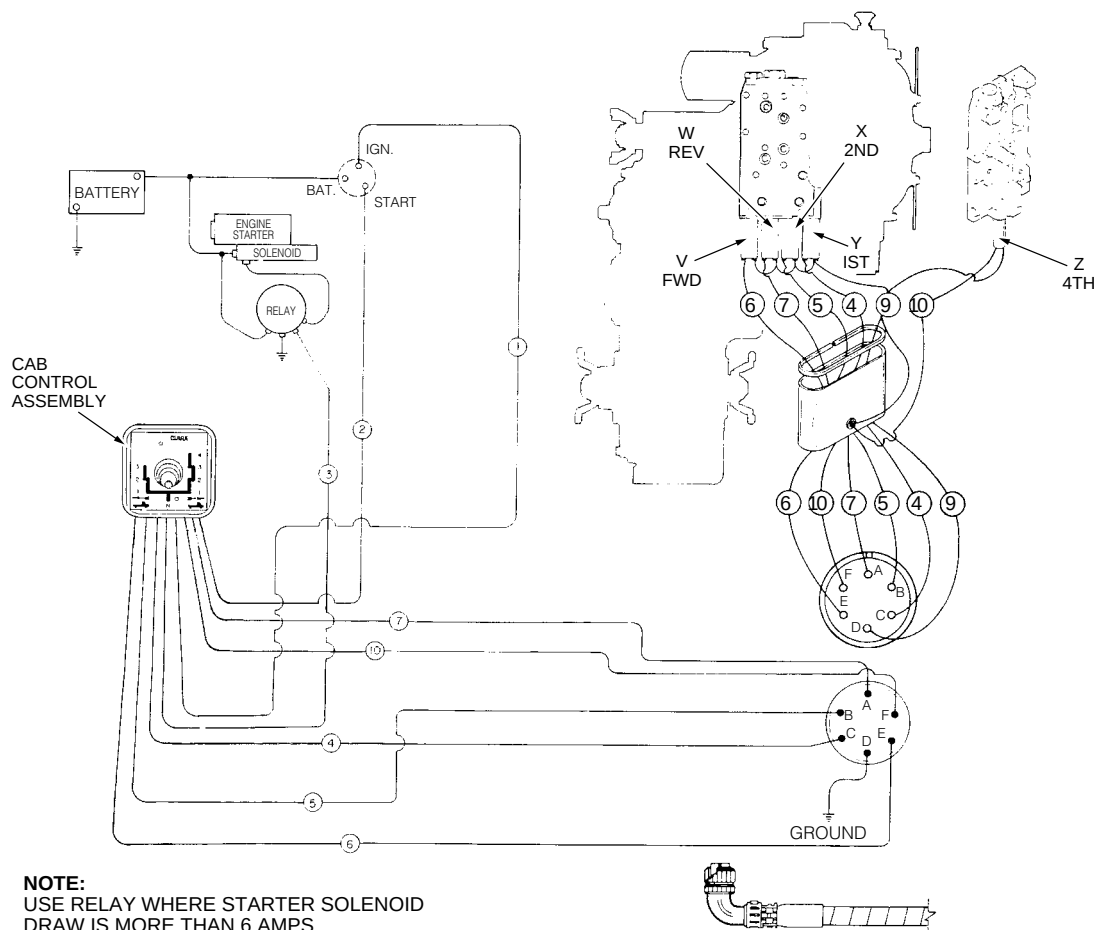
Operation of the unit

4-SPEED TRANSMISSION - ELECTRIC SOLENOID CONTROL

Direction & speed	Solenoids energized	Clutches pressurized
Forward 1st	V X Y	Forward & 1st
Forward 2nd	V X	Forward & 2nd
Forward 3rd	V	Forward & 3rd
Forward 4th	V Z	4th & 3rd
Reverse 1st	W X Y	Reverse & 1st
Reverse 2nd	W X	Reverse & 2nd
Reverse 3rd	W	Reverse & 3rd



4-SPEED TRANSMISSION ELECTRIC SOLENOID CONTROL WIRING DIAGRAM-12VDC AND 24VDC



NOTE:
USE RELAY WHERE STARTER SOLENOID
DRAW IS MORE THAN 6 AMPS

RELAY NO.
DELCO- REMY 1114238 DR- 12 VDC OR EQUIV.
DELCO- REMY 1114239 DR- 24 VDC OR EQUIV.

CAB CONTROL IS SUPPLIED WITH 36 INCHES
OF LEAD WIRE - BLANK ENDS.

WIRE SIZE:
NO. 18 A.G.W.

CAB CONTROL

SPEED	ENERGIZED WIRES
F1	1-4-5-6
F2	1-5-6
F3	1-6
F4	1-6-10
N STARTING ENGINE	2-3
R1	1-4-5-7
R2	1-5-7
R3	1-7

WIRE NO.	COLOR CODE
1	WHITE
2	BLACK
3	RED
4	YELLOW
5	GREEN
6	BLUE
7	BROWN
8	BLACK
9	ORANGE
10	PINK

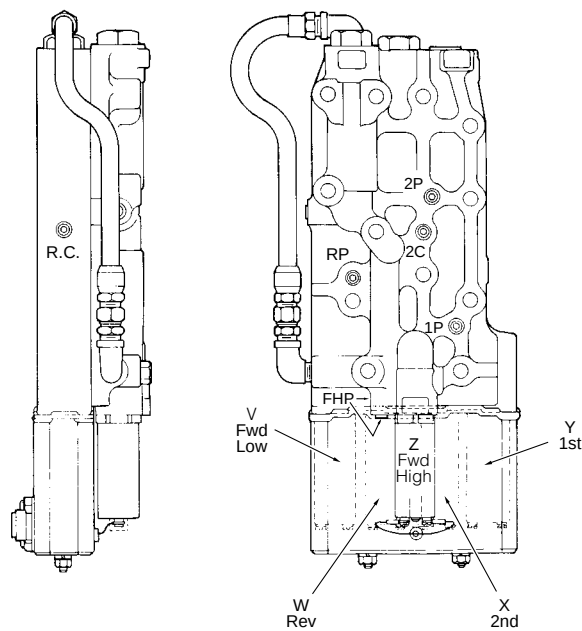
SYSTEM VOLTAGE	CONTROL VALVE ASSEMBLY
12 VDC AND 24 VDC	SEE MODEL PARTS LIST

SOLENOID	CAPACITY
240212	12VDC
240224	24VDC

Operation of the unit

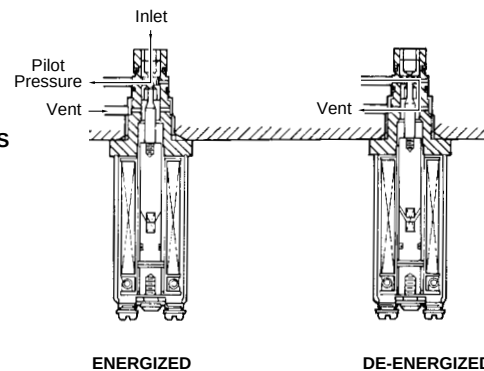
6-SPEED TRANSMISSION - ELECTRIC SOLENOID CONTROL

Direction & speed	Solenoids energized	Clutches pressurized
Forward 1st	V X Y	Forward & 1st
Forward 2nd	V X Y Z	Forward high & 2nd
Forward 3rd	V X	Forward & 3rd
Forward 4th	V X Z	Forward high & 4th
Forward 5th	V	Forward low, 1st
Forward 6th	V Z	Forward high & 6th
Reverse 1st	W X Y	Reverse & 1st
Reverse 2nd	W X	Reverse & 3rd
Reverse 3rd	W	Reverse & 5th

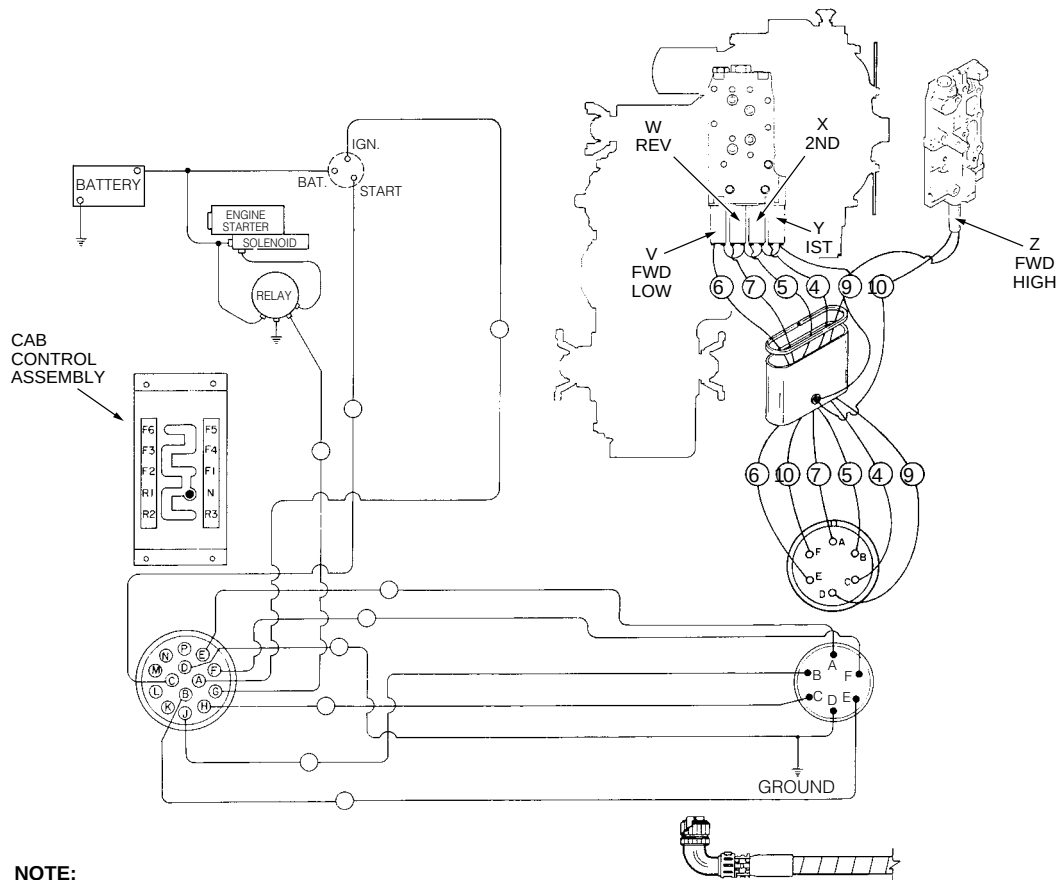


PILOT & CLUTCH PRESSURE CHECK POINTS

- 1P 1st Pilot
- 2P 2nd Pilot
- 2C 2nd Clutch
- FHP Fwd High Pilot
- R.P. Reverse Pilot
- R.C. Reverse Clutch



6-SPEED TRANSMISSION ELECTRIC SOLENOID CONTROL WIRING DIAGRAM-12VDC AND 24VDC



NOTE:
USE RELAY WHERE STARTER SOLENOID
DRAW IS MORE THAN 6 AMPS

RELAY NO.
DELCO- REMY 1114238 DR- 12 VDC OR EQUIV.
DELCO- REMY 1114239 DR- 24 VDC OR EQUIV.

CAB CONTROL IS SUPPLIED WITH 36 INCHES
OF LEAD WIRE - BLANK ENDS.

WIRE SIZE:
NO. 18 A.G.W.

SPEED	ENERGIZED WIRES
F1	1-4-5-6
F2	1-4-5-6-10
F3	1-5-6
F4	1-5-6-10
F5	1-6
F6	1-6-10
N STARTING ENGINE	2-3
R1	1-4-5-7
R2	1-5-7
R3	1-7

CAB CONTROL	
WIRE NO.	COLOR CODE
1	WHITE
2	BLACK
3	RED
4	YELLOW
5	GREEN
6	BLUE
7	BROWN
8	BLACK
9	ORANGE
10	PINK

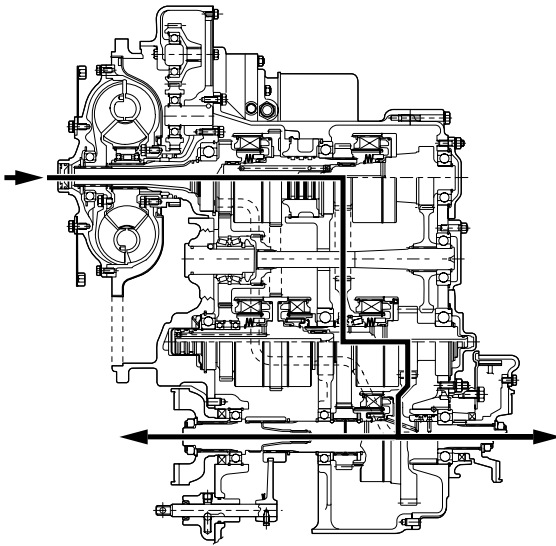
SYSTEM VOLTAGE	CONTROL VALVE ASSEMBLY
12 VDC AND 24 VDC	SEE MODEL PARTS LIST

SOLENOID	CAPACITY
240212	12VDC
240224	24VDC

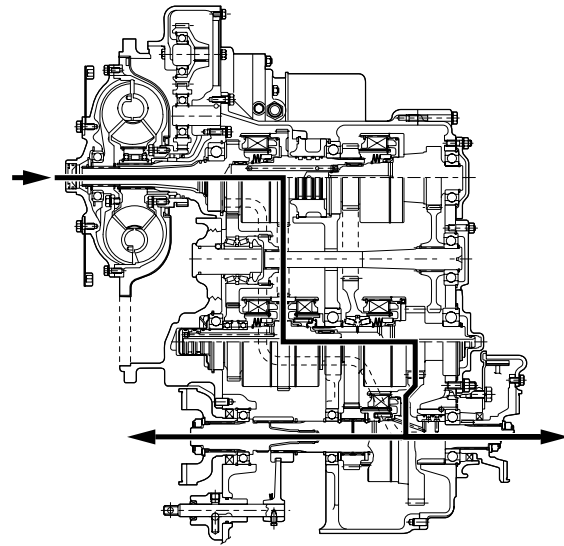
Operation of the unit

D. POWER FLOWS

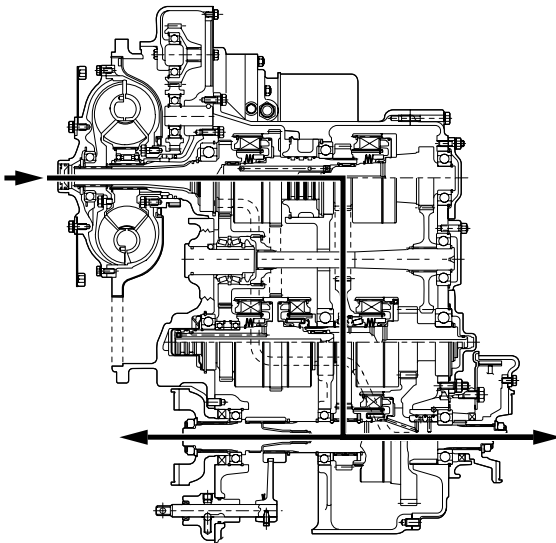
4-Speed transmission



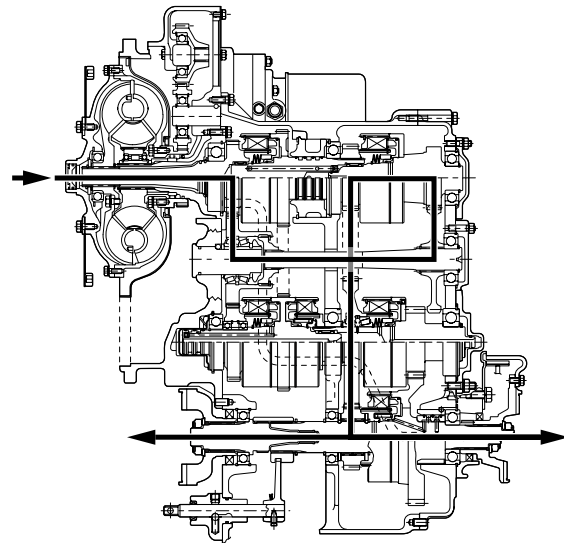
1st SPEED FORWARD



2nd SPEED FORWARD



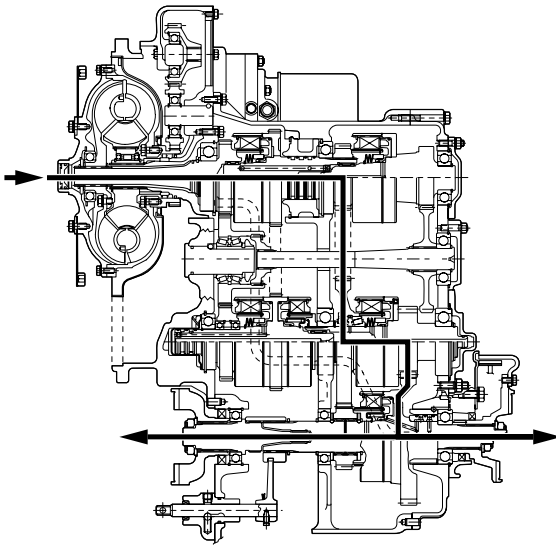
3rd SPEED FORWARD



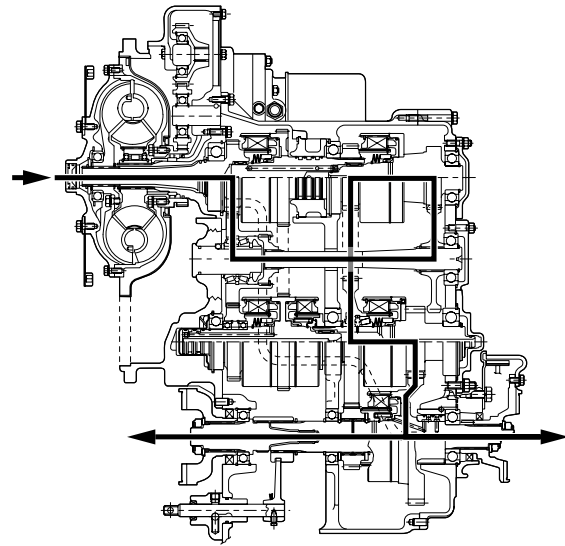
4th SPEED FORWARD

Operation of the unit

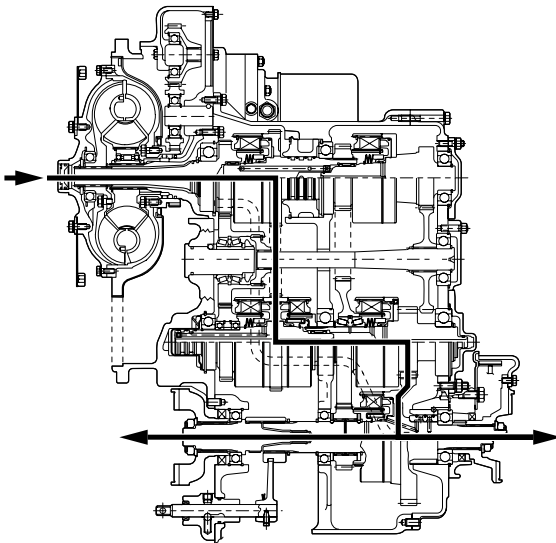
6-Speed transmission



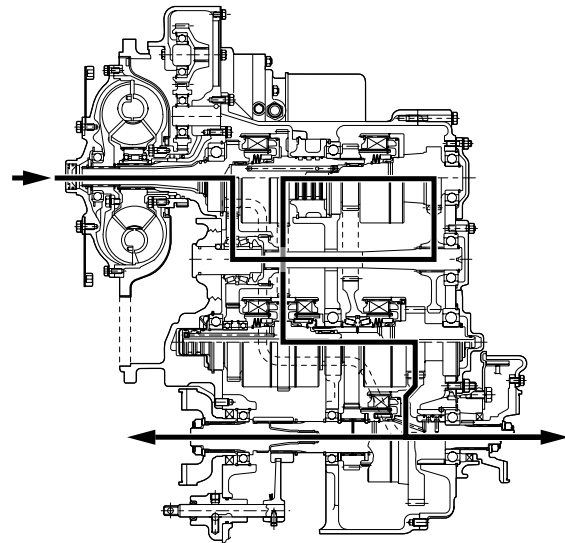
1st SPEED FORWARD



2nd SPEED FORWARD

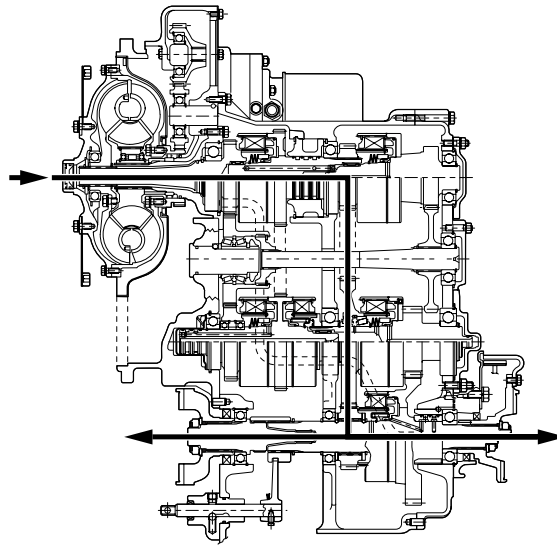


3rd SPEED FORWARD

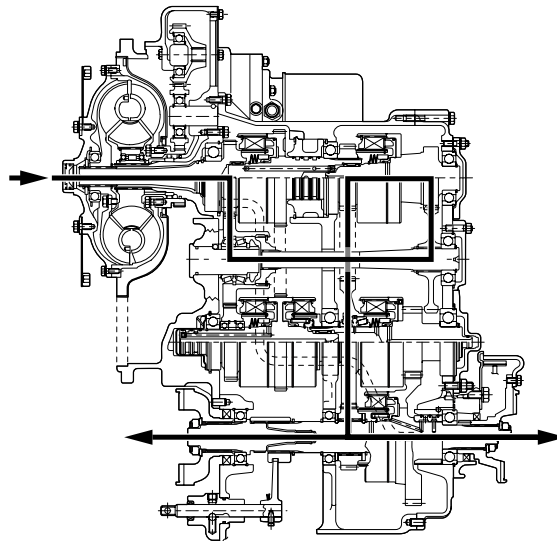


4th SPEED FORWARD

6-Speed transmission

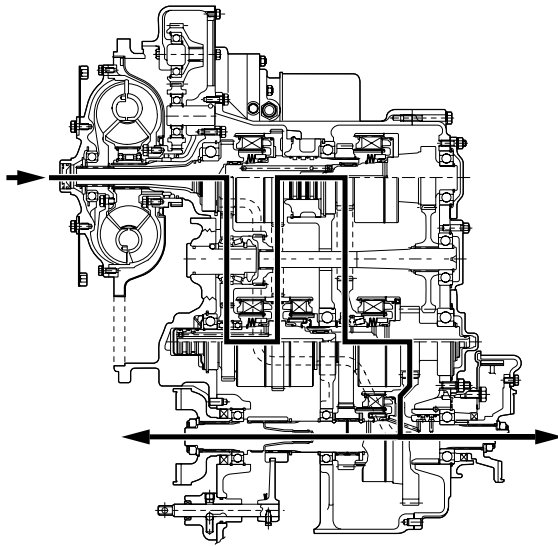


5th SPEED FORWARD

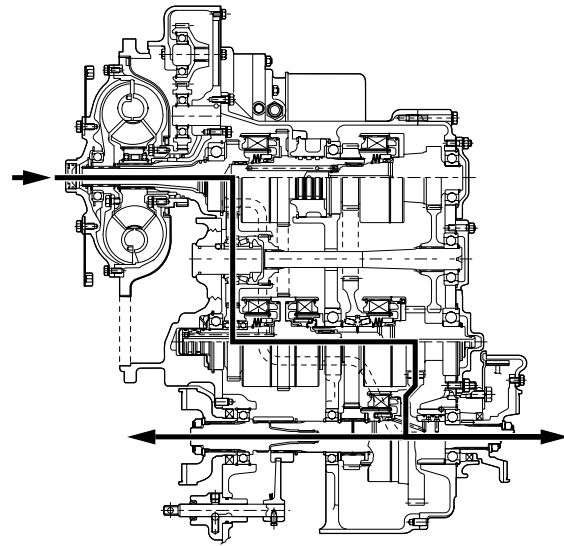


6th SPEED FORWARD

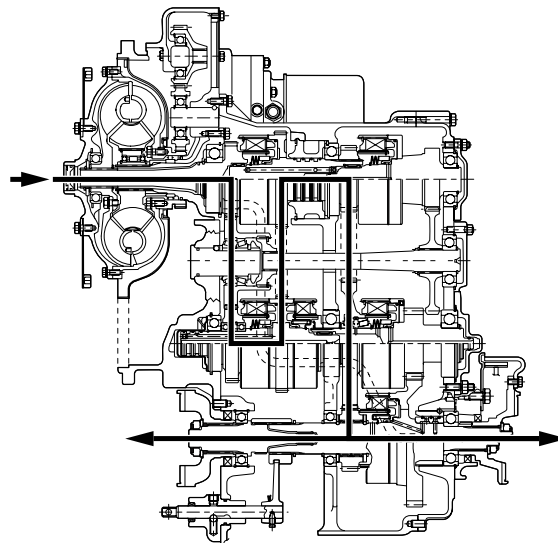
4-Speed and 6-Speed transmission



1st SPEED REVERSE



2nd SPEED REVERSE



3rd SPEED REVERSE

TROUBLESHOOTING GUIDE R & HR model 18000 Transmission

The following data is presented as an aid to locating the source of difficulty in a malfunctioning unit. It is necessary to consider the torque converter charging pump, transmission, oil cooler, and connecting lines as a complete system when running down the source of trouble since the proper operation of any unit therein depends greatly on the condition and operations of the others. By studying the principles of operation together with data in this section, it may be possible to correct any malfunction which may occur in the system.

Trouble shooting procedure basically consists of two classifications: mechanical and hydraulic:

Mechanical checks

Prior to checking any part of the system from a hydraulic standpoint, the following mechanical checks should be made:

1. A check should be made to be sure all control lever linkage is properly connected and adjusted at all connecting points.
2. Check shift levers and rods for binding or restrictions in travel that would prevent full engagement. Shift levers by hand at control valve, if full engagement cannot be obtained, difficulty may be in control cover and valve assembly.

Hydraulic checks

Before checking on the torque converter, transmission, and allied hydraulic system for pressure and rate of oil flow, it is essential that the following preliminary checks be made:

Check oil level in transmission.

This should be done with oil temperatures of 180 to 200 F. (82,2 - 93,3° C). DO NOT ATTEMPT THESE CHECKS WITH COLD OIL. To bring the oil temperature to this specification it is necessary to either work the machine or "stall" out the converter. Where the former means is impractical, the latter means should be employed as follows: Engage shift levers in forward and high speed and apply brakes. Accelerate engine half to three-quarter throttle.

Hold stall until desired converter outlet temperature is reached.



CAUTION: FULL THROTTLE STALL SPEEDS FOR AN EXCESSIVE LENGTH OF TIME OVERHEAT THE CONVERTER.

Troubleshooting guide

Troubleshooting guide

Refer to the following troubleshooting guide for the diagnosis of typical transmission troubles.

Low clutch pressure

CAUSE	REMEDY
1. Low oil level.	1. Fill to proper level.
2. Clutch pressure regulating valve spool stuck open.	2. Clean valve spool and housing.
3. Faulty charging pump.	3. Replace pump.
4. Broken or worn clutch shaft or piston sealing rings.	4. Replace sealing rings.
5. Clutch piston bleed valve stuck open.	5. Clean bleed valves thoroughly.

Low converter charging pump output

CAUSE	REMEDY
1. Low oil level.	1. Fill to proper level.
2. Suction screen plugged.	2. Clean suction screen.
3. Air leaks at pump intake hose and connection or collapsed hose. (R-18000 only)	3. Tighten all connections or replace hose if necessary.
4. Defective oil pump.	4. Replace pump.

Overheating

CAUSE	REMEDY
1. Worn oil sealing rings.	1. Remove, disassemble, and rebuild converter assembly.
2. Worn oil pump.	2. Replace.
3. Low oil level.	3. Fill to proper level.
4. Pump suction line taking air. (R-18000 only)	4. Check oil line connections and tighten securely.

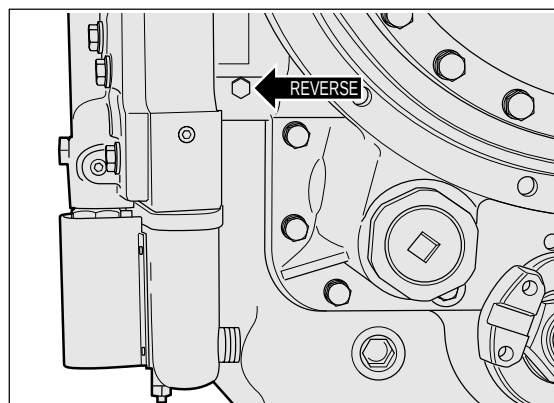
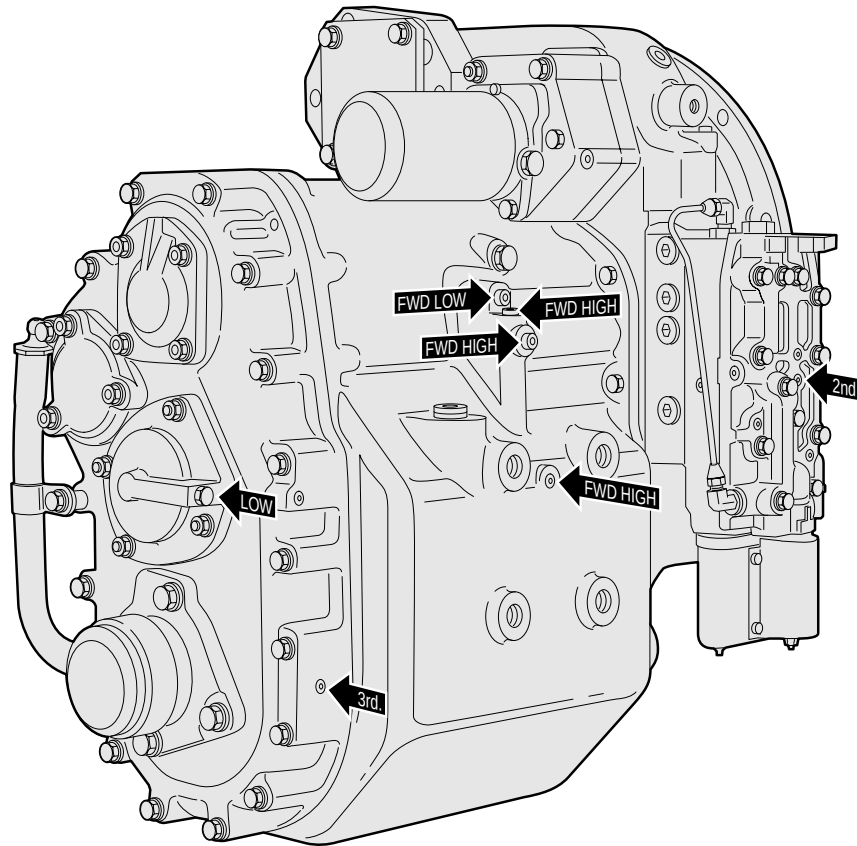
Noisy converter

CAUSE	REMEDY
1. Worn oil pump.	1. Replace
2. Damaged bearings.	2. A complete disassembly will be necessary to determine what bearing is faulty.

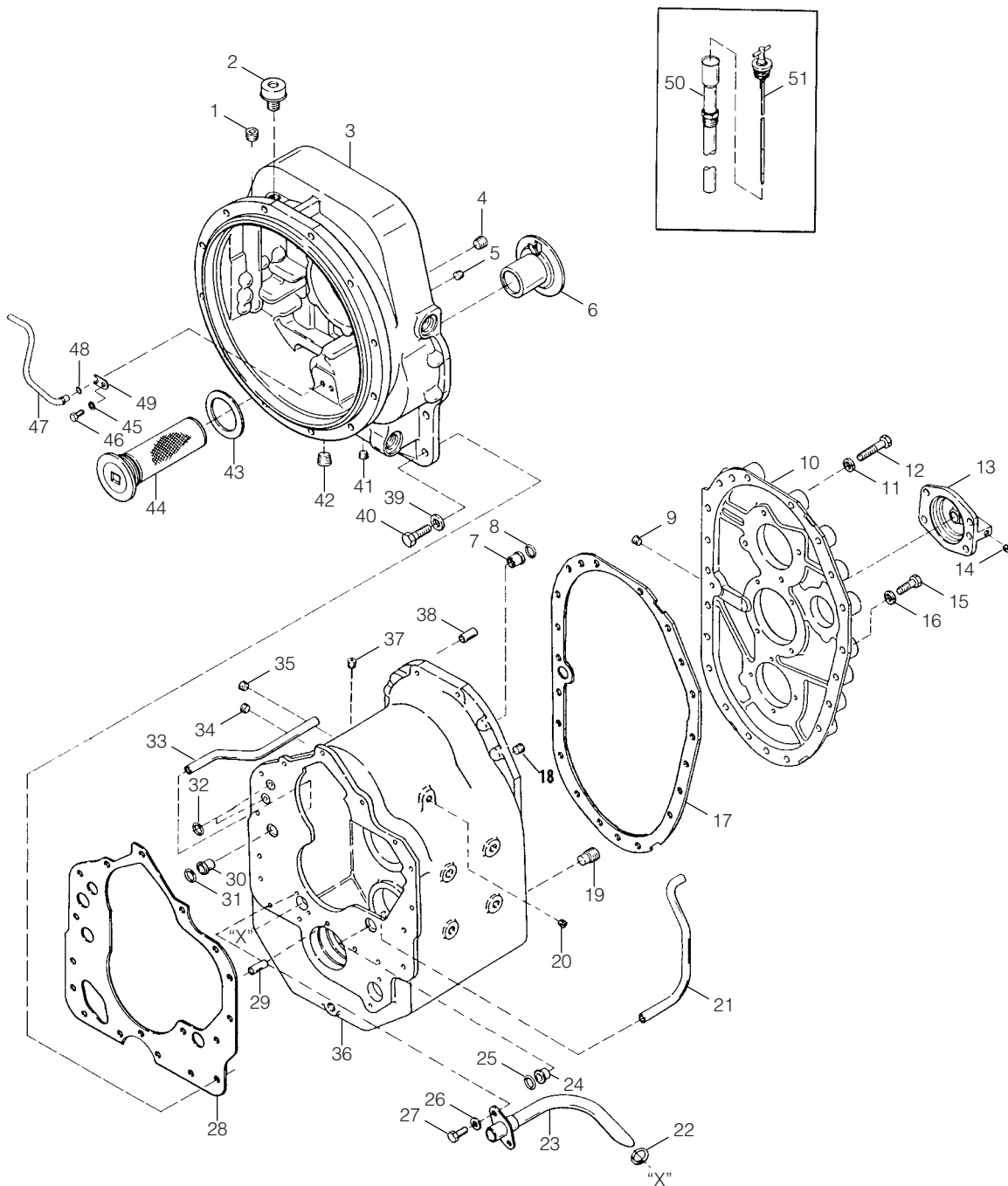
Lack of power

CAUSE	REMEDY
1. Low engine RPM at converter shell.	1. Turn engine check governor.
2. See "Overheating" and make same checks	2. Make corrections as explained in "Overheating".

CHECK POINTS

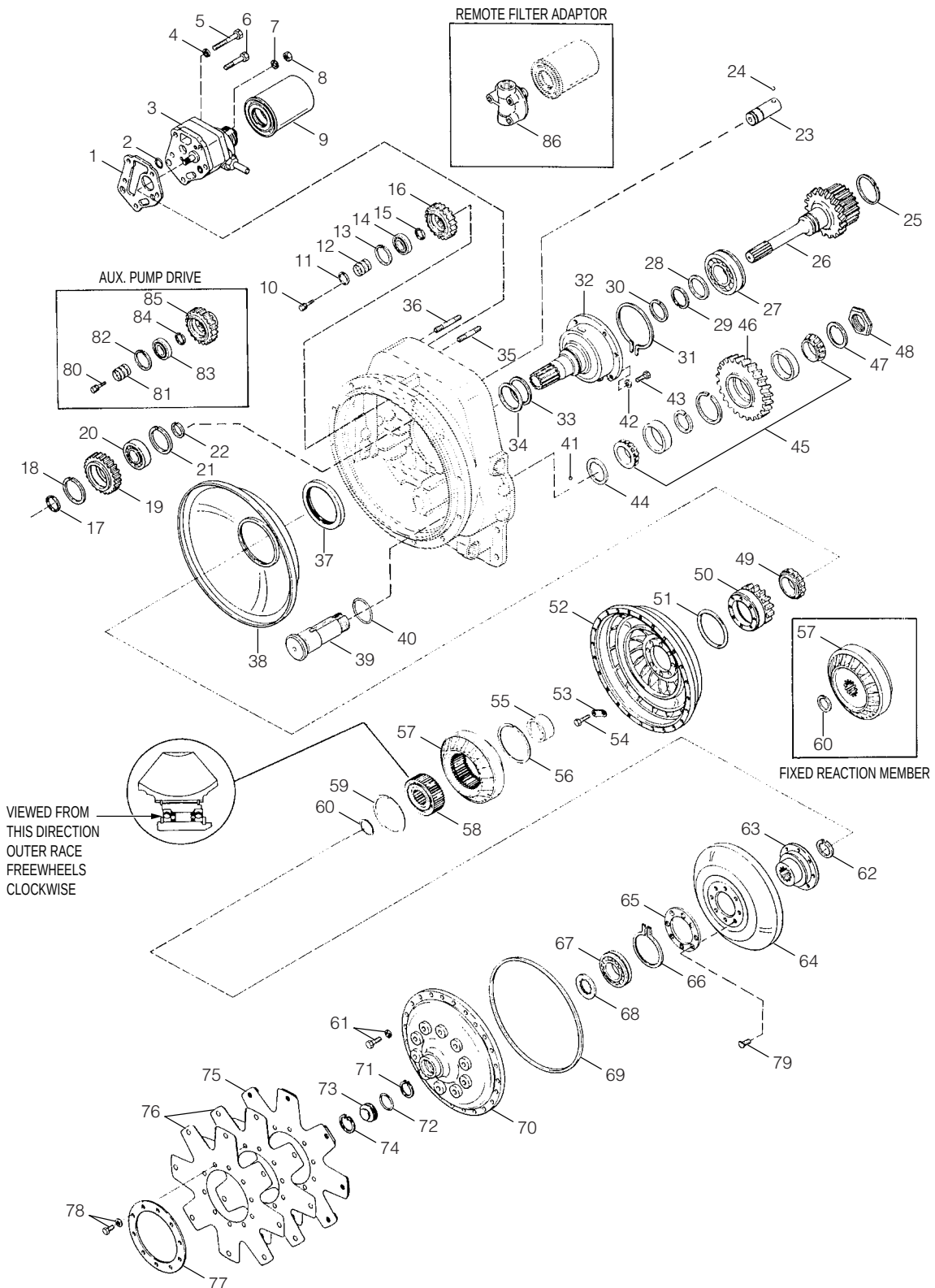


GROUP - CONVERTER HOUSING, TRANSMISSION CASE & REAR COVER



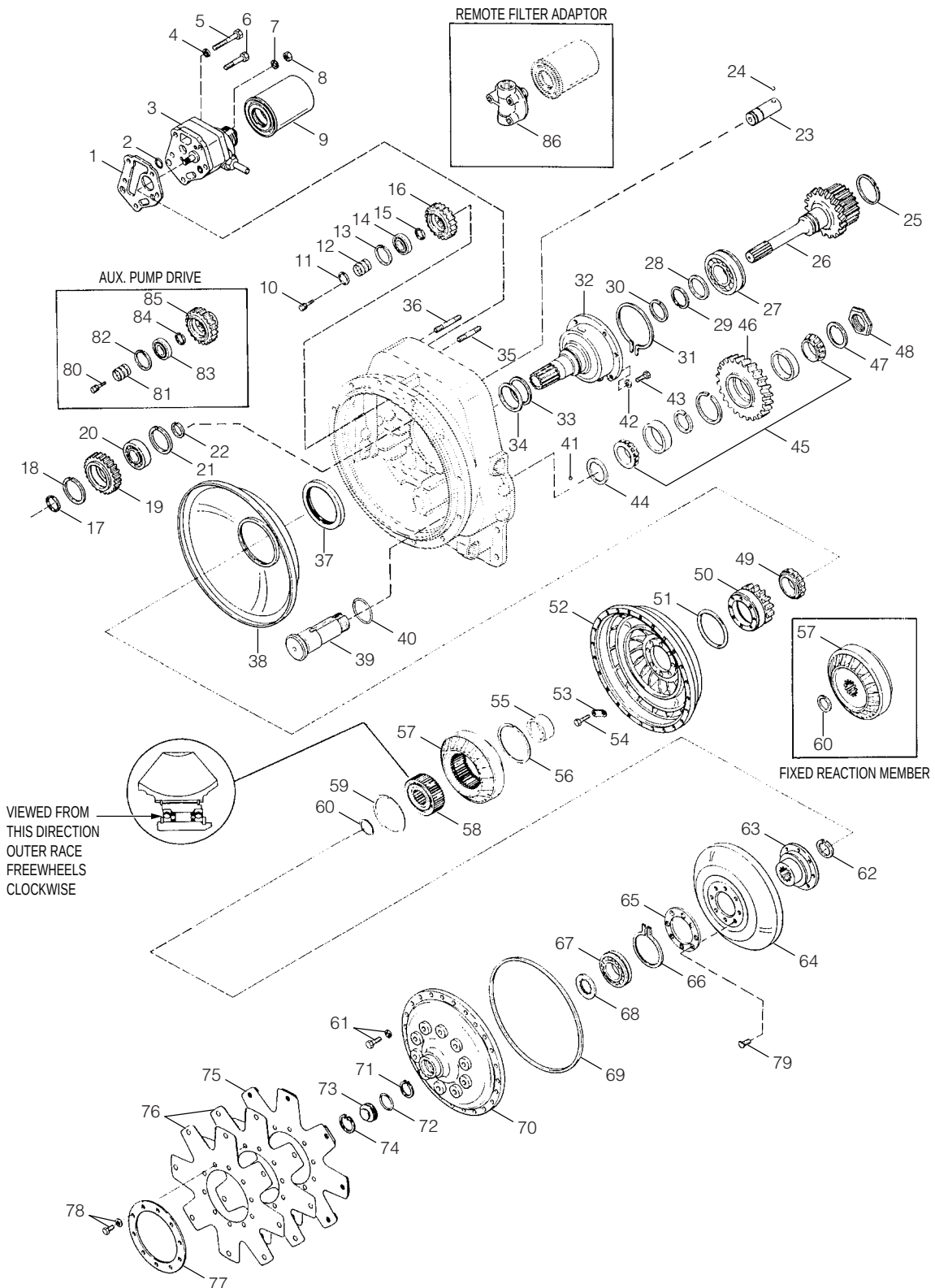
GROUP - CONVERTER HOUSING, TRANSMISSION CASE & REAR COVER

Item	Description	Quantity
1	Pipe plug	1
2	Air breather	1
3	Converter housing	1
4	Pipe plug	1
5	Pipe plug	1
6	Converter housing sleeve	1
7	Tube sleeve	1
8	Pressure tube "O" ring	1
9	Cover pipe plug	1
10	Rear cover	1
11	Rear cover to case screw lockwasher	10
12	Rear cover to case screw	10
13	Low shaft rear bearing cap	1
14	Plug	1
15	Rear cover to case screw	10
16	Rear cover to case screw lockwasher	10
17	Rear cover to case gasket	1
18	Pipe plug	1
19	Magnetic drain plug	2
20	Pipe plug	1
21	Clutch lube tube	1
22	Suction line "O" ring	1
23	Suction tube assembly	1
24	Tube sleeve	1
25	Pressure tube "O" ring	1
26	Retainer screw lockwasher	2
27	Suction line retainer screw	2
28	Converter housing to trans. case gasket	1
29	Dowel pin	1
30	Tube sleeve	1
31	Pressure tube "O" ring	1
32	Clutch pressure "O" ring	2
33	Low speed clutch pressure tube	1
34	Pipe plug	1
35	Pipe plug	1
36	Transmission case	1
37	Dipstick hole plug	1
38	Case to cover dowel pin	2
39	Housing to case screw lockwasher	16
40	Housing to case screw	16
41	Pipe plug	1
42	Pipe plug	1
43	Screen assembly gasket	1
44	Screen assembly	1
45	Tube clip screw lockwasher	1
46	Tube clip screw	1
47	Lube bypass tube	1
48	Tube "O" ring	1
49	Tube clip	1
50	Dipstick tube assembly	1
51	Dipstick	1



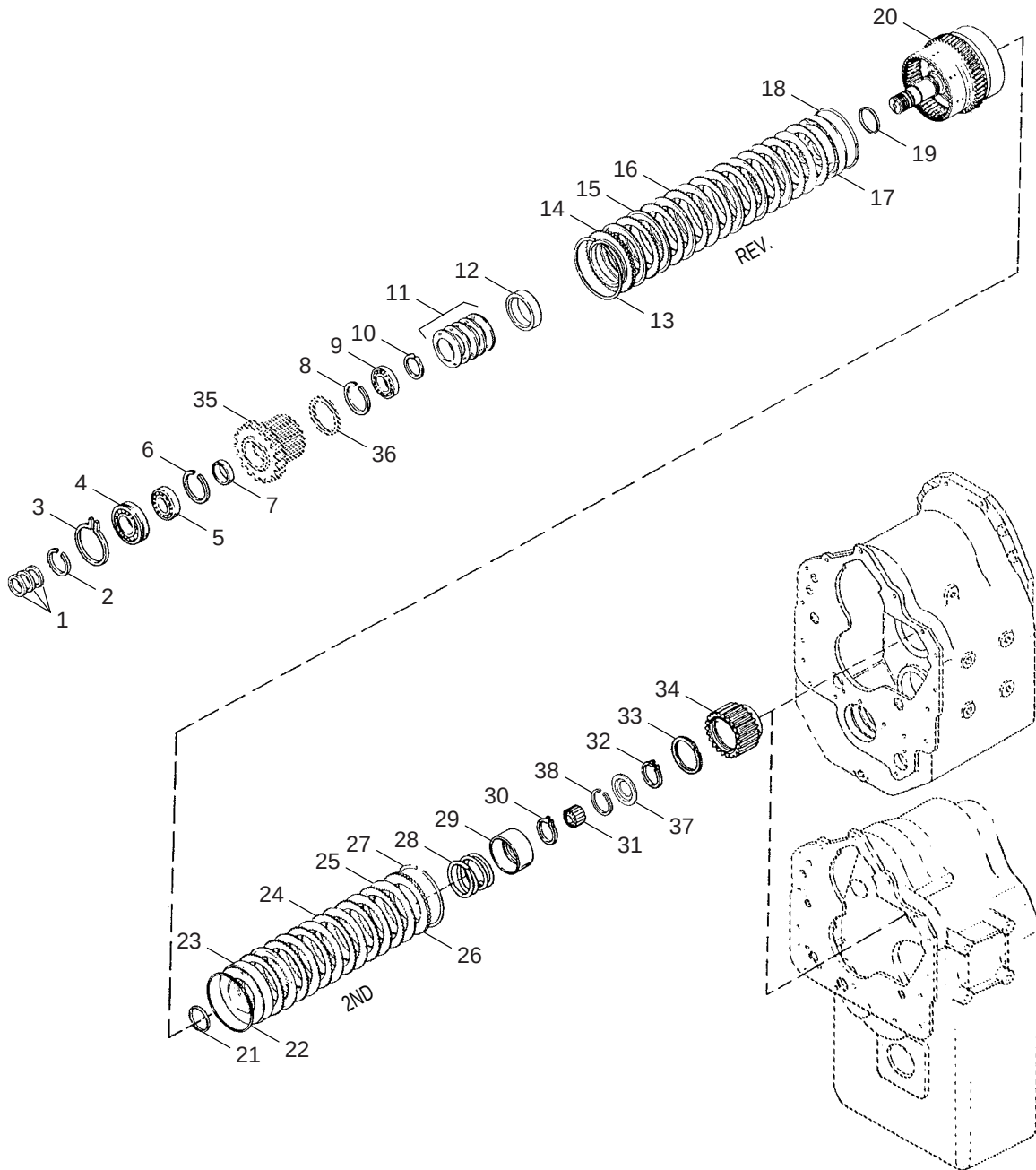
GROUP - CONVERTER (HR MODEL ONLY)

Item	Description	Quantity
1	Pump to housing gasket	1
2	"O" ring	1
3	Charging pump assembly	1
4	Pump mounting screw lockwasher	3
5	Pump mounting screw	1
6	Pump mounting screw	2
7	Pump mounting screw stud lockwasher	2
8	Pump mounting stud nut	2
9	Filter assembly	1
10	Bearing support screw	2
11	Bearing locating ring	1
12	Pump drive bearing support	1
13	Bearing retaining ring	1
14	Pump drive gear bearing	1
15	Bearing locating ring	1
16	Pump drive gear	1
17	Idler gear bearing locating ring	1
18	Idler gear bearing retaining ring	1
19	Pump drive idler gearing	1
20	Idler shaft bearing	1
21	Bearing retaining ring	1
22	Bearing locating ring	1
23	Idler gear stub shaft	1
24	Stub shaft lock ball	1
25	Baffle ring	1
26	Turbine shaft & disc hub assembly	1
27	Turbine shaft bearing	1
28	Bearing locating washer	1
29	Bearing retaining ring	1
30	Piston ring	1
31	Bearing snap ring	1
32	Reaction member support	1
33	Piston ring expander spring	1
34	Piston ring	1
35	Pump mounting stud	1
36	Pump mounting stud	1
37	Oil seal	1
38	Oil baffle assembly	1
39	Reverse idler shaft	1
40	Reverse idler shaft "O" ring	1
41	Reverse idler shaft lock ball	1
42	Support screw washer	6
43	Reaction member support screw	6
44	Bearing retainer thrust plate	1
45	Reverse idler gear bearing assembly	1
46	Reverse idler gear	1
47	Bearing retaining thrust plate	1
48	Retaining plate nut	1
49	Impeller hub gear bearing	1
50	Impeller hub gear	1
51	Impeller hub "O" ring	1
52	Impeller	1
53	Impeller to hub screw lock tab	4
54	Impeller to hub screw	8
55	Reaction member spacer	1



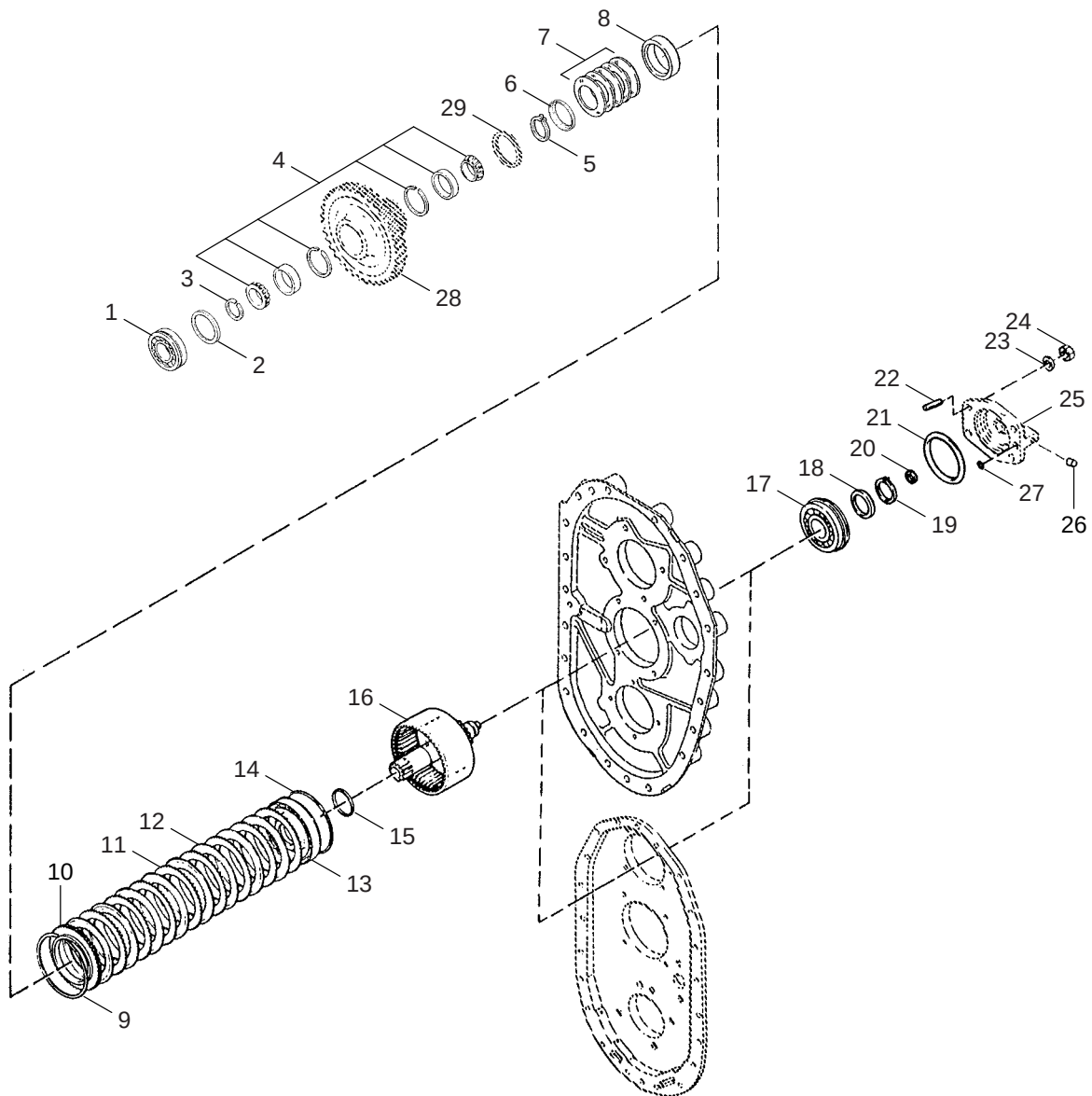
GROUP - CONVERTER (HR MODEL ONLY)

Item	Description	Quantity
56	Freewheel outer race snap ring	1
57	Reaction member	1
58	Freewheel assembly	1
59	Freewheel outer race snap ring	1
60	Reaction member retaining ring	1
61	Impeller to cover screw and lockwasher	18
62	Turbine retaining ring	1
63	Turbine hub	1
64	Turbine	1
65	Turbine backing ring	1
66	Turbine hub bearing locating ring	1
67	Turbine hub bearing	1
68	Bearing retaining washer	1
69	Impeller to cover "O" ring	1
70	Impeller cover	1
71	Turbine retaining ring	1
72	Impeller cover bore plug "O" ring	1
73	Bore plug	1
74	Bore plug retaining ring	1
75	Drive plate assembly	1
76	Drive plate	2
77	Drive plate backing ring	1
78	Drive plate mounting screw & lockwasher	10
79	Turbine hub screw	12
80	Bearing support screw & lockwasher	2
81	Auxiliary pump drive bearing support	1
82	Bearing retaining ring	1
83	Pump drive gear bearing	1
84	Bearing locating ring	1
85	Auxiliary pump drive gear	1
86	Remote filter adapter (optional)	1



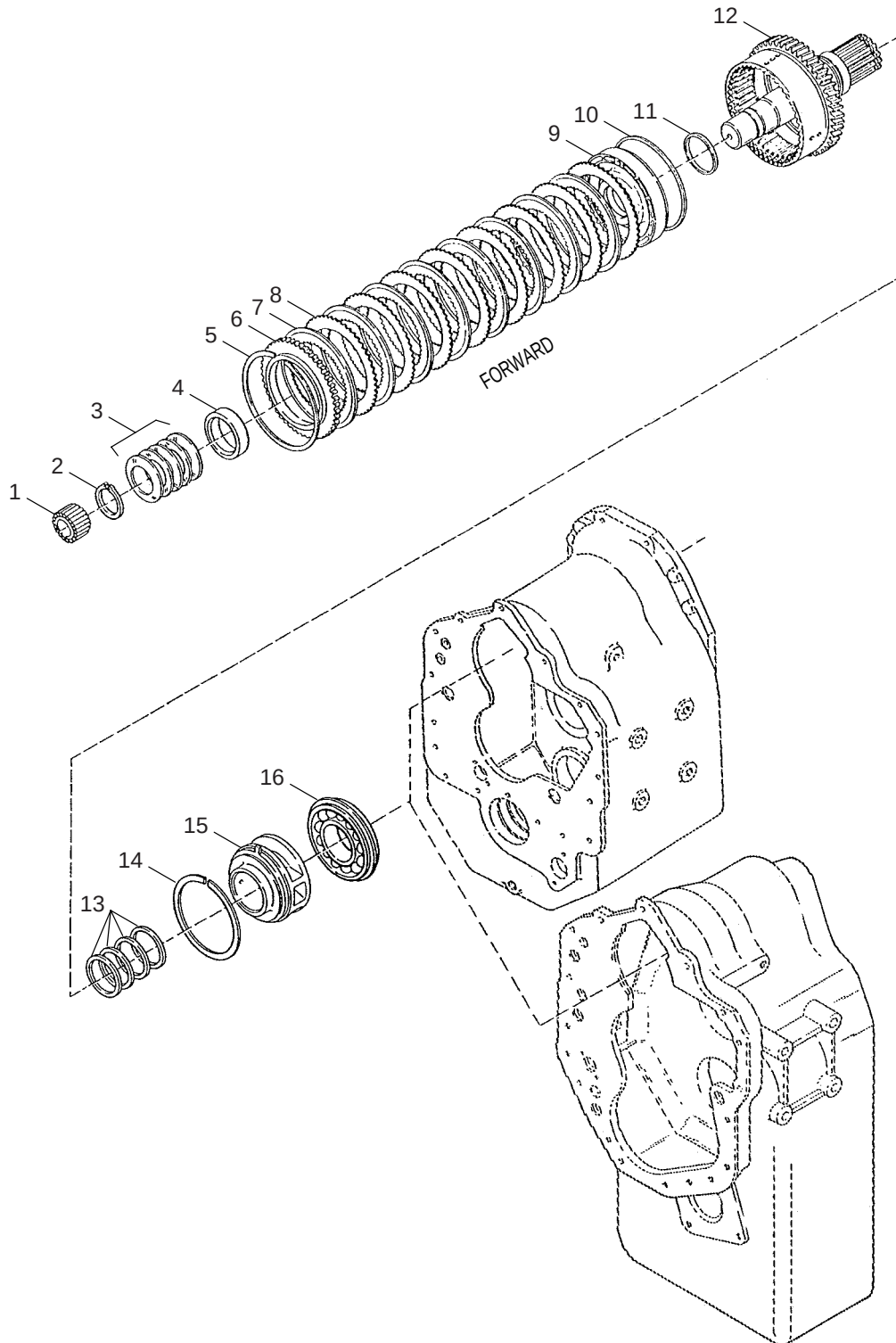
GROUP - REVERSE & 2ND SHAFT

Item	Description	Quantity
1	Reverse & 2nd shaft piston ring	3
2	Front bearing retaining ring	1
3	Front bearing snap ring	1
4	Reverse & 2nd shaft front bearing	1
5	Clutch driven gear bearing	1
6	Bearing retaining ring	1
7	Clutch driven gear bearing spacer	1
8	Bearing retaining ring	1
9	Clutch driven gear bearing	1
10	Spring retainer snap ring	1
11	Piston return belleville springs assembly.	1
	Incl. 5 washers	1
12	Piston return spring spacer	1
13	Backing plate snap ring	1
14	Clutch disc backing plate	1
15	Clutch inner disc	8
16	Clutch outer disc	8
17	Clutch piston	1
18	Outer clutch piston seal	1
19	Inner clutch piston seal	1
20	Rev. & 2nd shaft, drum & plug assembly	1
21	Inner clutch piston seal	1
22	Outer clutch piston seal	1
23	Clutch piston	1
24	Clutch outer disc	6
25	Clutch inner disc	6
26	Clutch disc backing plate	1
27	Backing plate snap ring	1
28	Piston return spring	1
29	Spring retainer	1
30	Spring retainer snap ring	1
31	Rev. & 2nd shaft rear bearing	1
32	2nd clutch disc hub snap ring	1
33	Retaining ring	1
34	2nd clutch disc hub	1
35	Rev. clutch gear & retaining ring assembly	1
36	Retaining ring	1
37	Retainer	1
38	Retainer snap ring	1



GROUP - LOW SPEED SHAFT

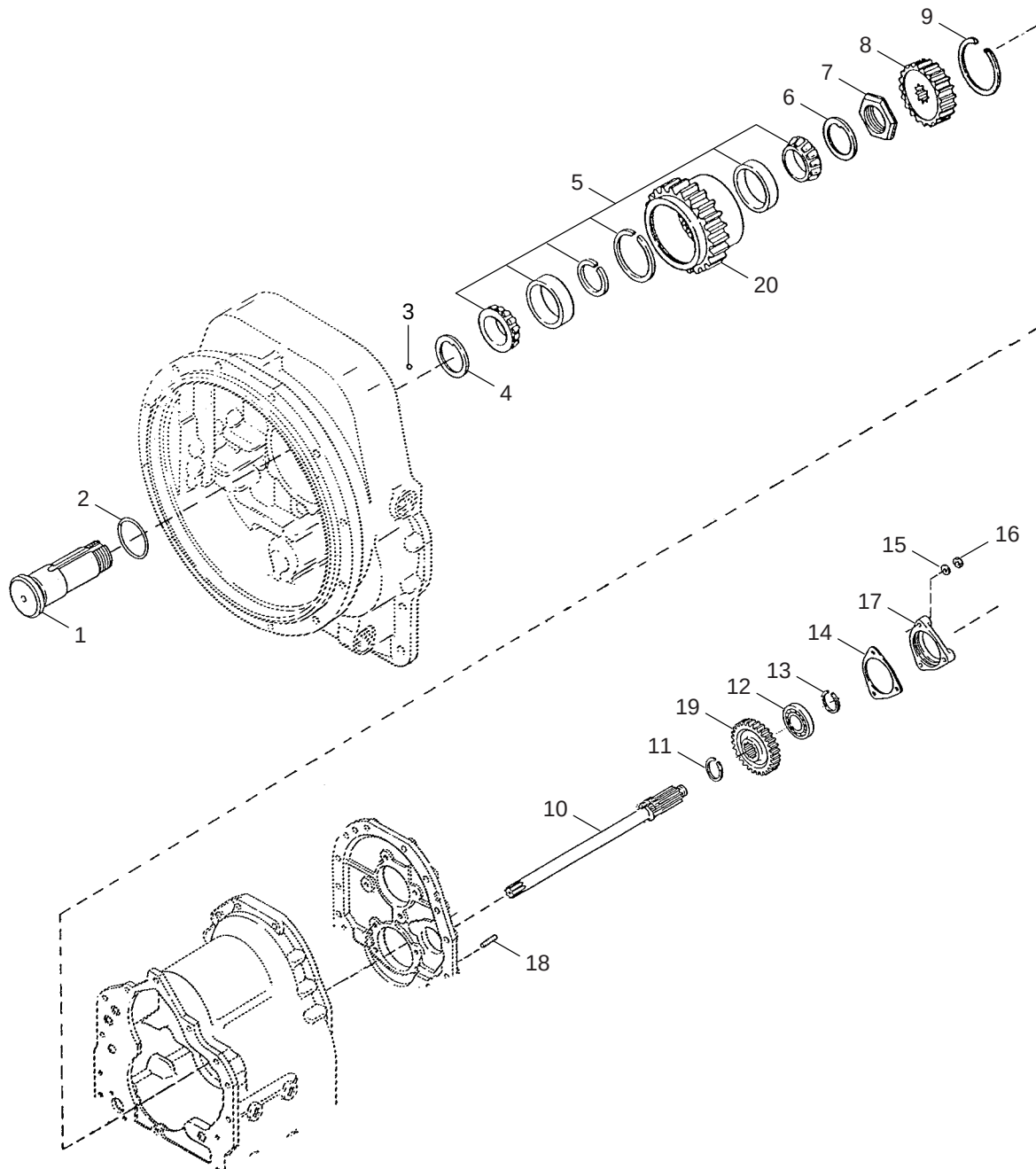
Item	Description	Quantity
1	Low speed clutch shaft front bearing	1
2	Retainer ring retainer	1
3	Low gear bearing retaining ring	1
4	Low gear bearing assembly	1
5	Spring retainer snap ring	1
6	Retainer ring retainer	1
7	Disc spring assembly, incl. 5 washers	1
8	Belleville washer spacer	1
9	Backing plate snap ring	1
10	Clutch disc backing plate	1
11	Clutch outer disc	8
12	Clutch inner disc	8
13	Clutch piston	1
14	Outer clutch piston ring	1
15	Inner clutch piston seal	1
16	Low clutch shaft drum & bleed valve assembly	1
17	Low speed shaft rear bearing	1
18	Rear bearing support washer	1
19	Rear bearing retaining ring	1
20	Low shaft piston ring	1
21	Rear bearing cap "O" ring	1
22	Bearing cap stud	4
23	Bearing cap stud lockwasher	4
24	Bearing cap stud nut	4
25	Low shaft rear bearing cap assembly	1
26	Plug	1
27	Bearing cap "O" ring	1
28	Low shaft gear, hub assembly	1
29	Retaining ring	1



GROUP - FORWARD SHAFT

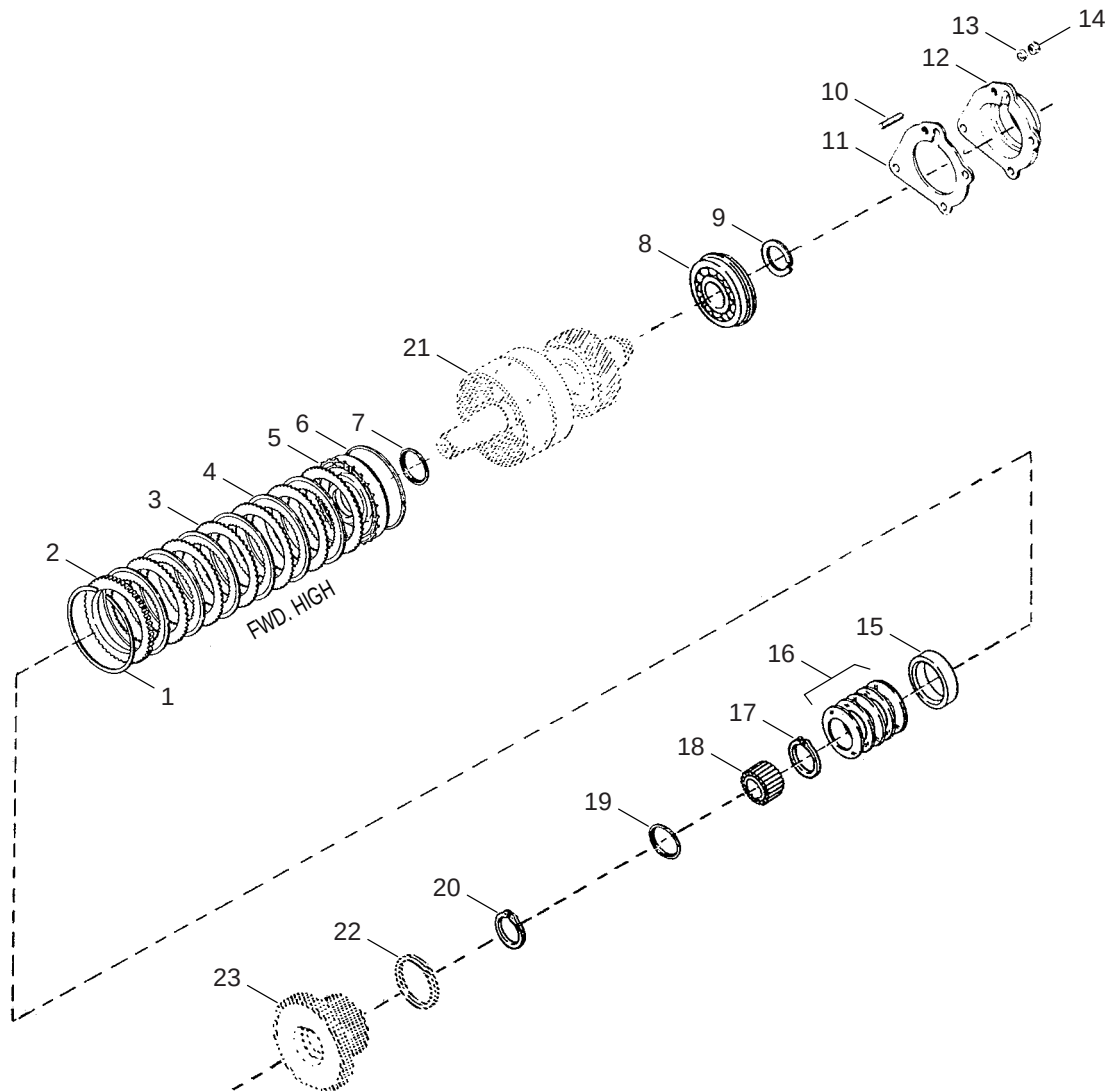
Item	Description	Quantity
1	Forward shaft pilot bearing	1
2	Spring retaining snap ring	1
3	Disc spring assembly incl. 5 washers	1
4	Piston return spring spacer	1
5	Backing plate snap ring	1
6	Clutch disc backing plate	1
7	Clutch inner disc	8
8	Clutch outer disc	8
9	Clutch piston	1
10	Clutch piston ring - outer	1
11	Clutch piston seal - inner	1
12	Forward shaft, drum, & plug assembly	1
13	Forward shaft piston ring	4
14	Piston ring sleeve retaining ring	1
15	Piston ring sleeve	1
16	Forward shaft rear bearing	1

GROUP - REVERSE IDLER AND FORWARD-HIGH DRIVE



GROUP - REVERSE IDLER AND FORWARD-HIGH DRIVE

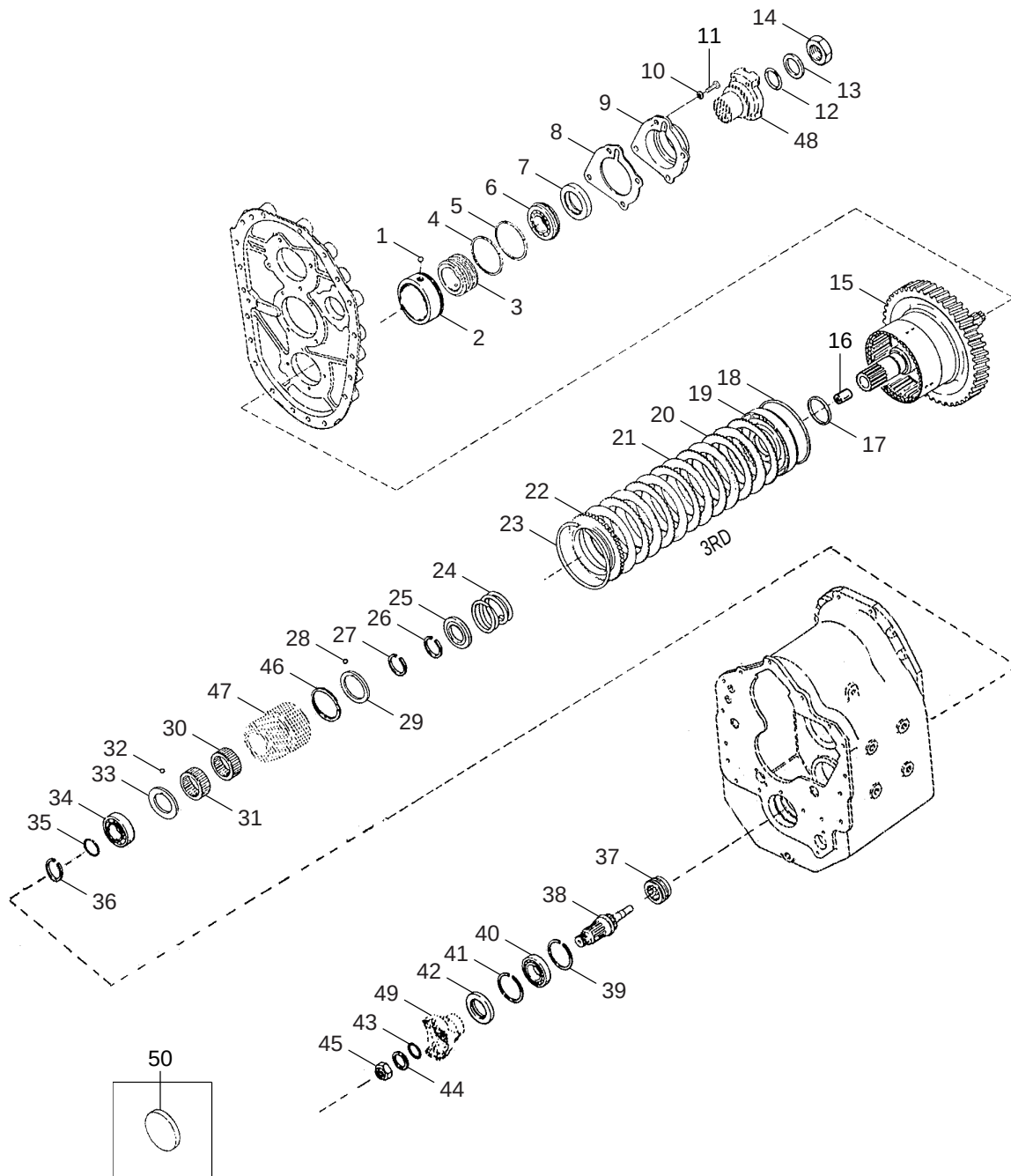
Item	Description	Quantity
1	Reverse idler shaft	1
2	Idler shaft "O" ring	1
3	Idler shaft lockball	1
4	Reverse idler gear brg. thrust plate	1
5	Reverse idler gear bearing assembly	1
6	Reverse idler gear brg. thrust plate	1
7	Bearing retaining plate nut	1
8	Drive adaptor	1
9	Drive adaptor snap ring	1
10	Fwd-hi drive shaft	1
11	Fwd-hi drive gear snap ring	1
12	Drive shaft rear bearing	1
13	Rear bearing snap ring	1
14	Bearing cap gasket	1
15	Bearing cap stud nut lockwasher	3
16	Bearing cap stud nut	3
17	Fwd-hi drive shaft bearing cap	1
18	Bearing cap stud	3
19	Fwd-hi drive gear	1
20	Reverse idler gear	1



GROUP - FORWARD HIGH SHAFT

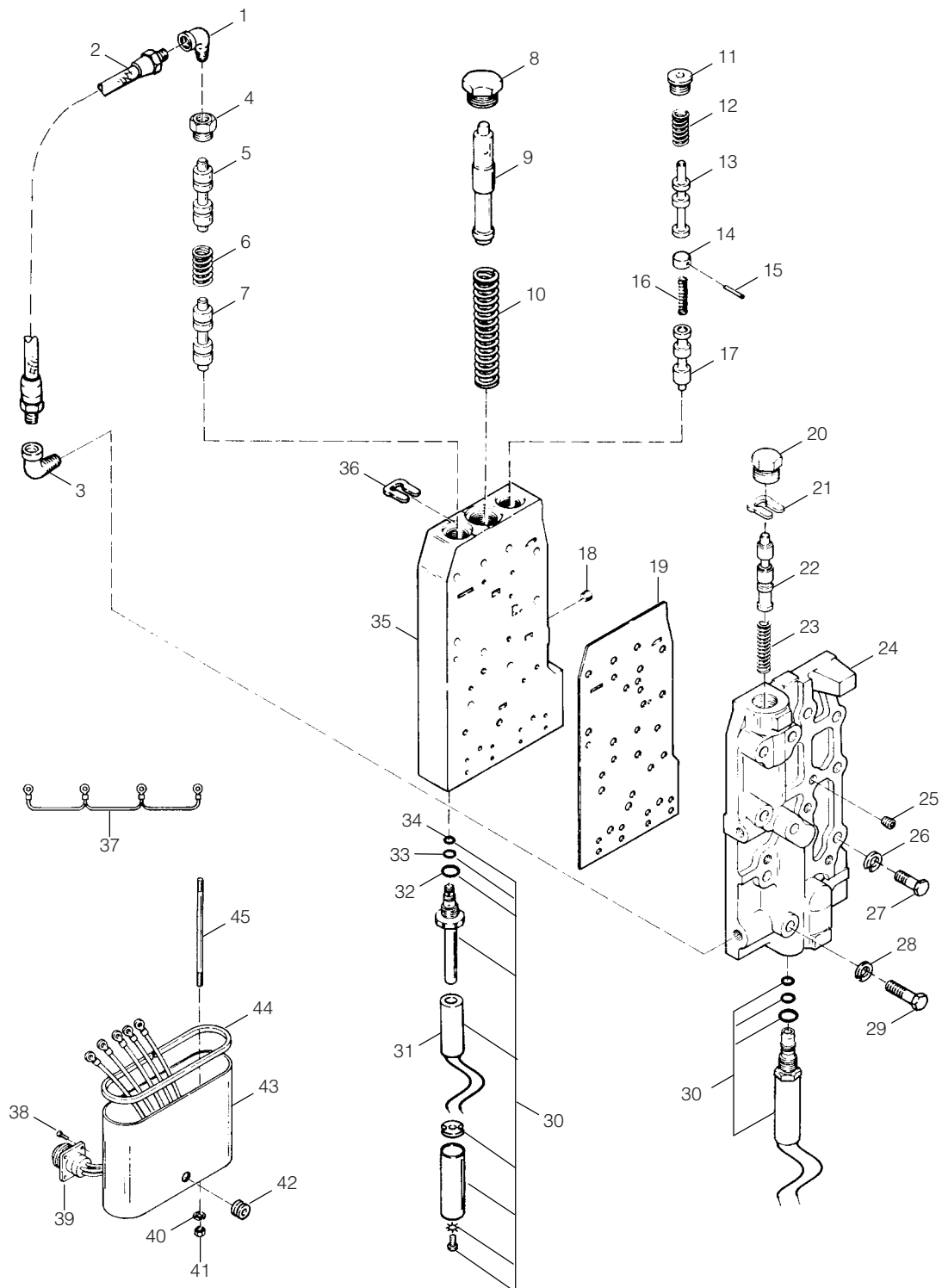
Item	Description	Quantity
1	Backing plate snap ring	1
2	Clutch disc backing plate	1
3	Clutch outer disc	8
4	Clutch inner disc	8
5	Clutch piston	1
6	Clutch piston outer seal	1
7	Clutch piston inner seal	1
8	High shaft rear bearing	8
9	High shaft rear bearing ret. ring	1
10	Rear bearing cap stud	4
11	High shaft bearing cap gasket	1
12	High shaft rear bearing cap	1
13	Rear bearing cap stud lockwasher	4
14	Rear bearing cap stud	4
15	Piston return spring spacer	1
16	Disc spring assembly incl. 5 washers	1
17	Spring retainer	1
18	High shaft pilot bearing	1
19	High shaft piston ring	1
20	High clutch gear & hub retaining ring	1
21	High clutch shaft, drum & hub assembly	1
22	Retaining ring	1
23	High gear hub	1

GROUP - OUTPUT SHAFT AND 3RD CLUTCH



GROUP - OUTPUT SHAFT AND 3RD CLUTCH

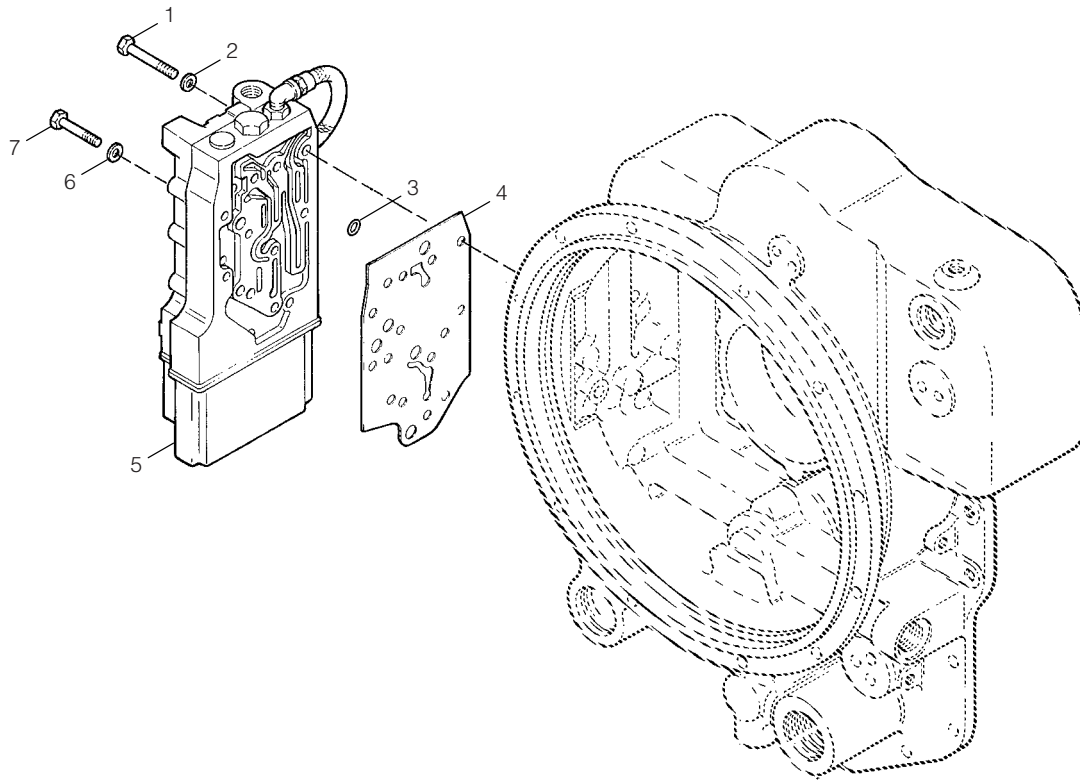
Item	Description	Quantity
1	Sleeve locator ball	1
2	3rd clutch distributor sleeve	1
3	3rd & lube distributor	1
4	Piston ring expander	3
5	Distributor piston ring	3
6	Output shaft rear bearing	1
7	Rear bearing cap oil seal	1
8	Output shaft bearing cap gasket	1
9	Output shaft rear bearing cap	1
10	Rear bearing cap screw lockwasher	4
11	Rear bearing cap screw	4
12	Flange "O" ring	1
13	Flange washer	1
14	Rear flange nut	1
15	3rd output shaft bushing & plug assembly	1
16	Bushing	1
17	Clutch piston inner seal	1
18	Clutch piston outer seal	1
19	Clutch piston assembly	1
20	Clutch outer disc	6
21	Clutch inner disc	6
22	Clutch disc backing plate	1
23	Backing plate snap ring	1
24	Piston return spring	1
25	Spring retainer	1
26	Spring retainer snap ring	1
27	Thrust washer snap ring	1
28	Thrust washer locating ball	1
29	3rd clutch gear thrust washer	1
30	3rd clutch gear bearing	1
31	3rd clutch gear bearing	1
32	Thrust washer locating ball	1
33	3rd clutch gear thrust washer	1
34	Output shaft front bearing	1
35	Front bearing ret. snap ring	1
36	Shift hub stop snap ring	1
37	Drive sleeve	1
38	Front disconnect shaft	1
39	Bearing retaining ring	1
40	Disconnect shaft bearing	1
41	Bearing retaining ring	1
42	Oil seal	1
43	Flange "O" ring	1
44	Flange washer	1
45	Front flange nut	1
46	Retaining ring	1
47	3rd gear and hub assembly	1
48	Rear output flange	1
49	Front output flange	1
50	Output shaft hole plug	1



GROUP - ELECTRIC CONTROL VALVE

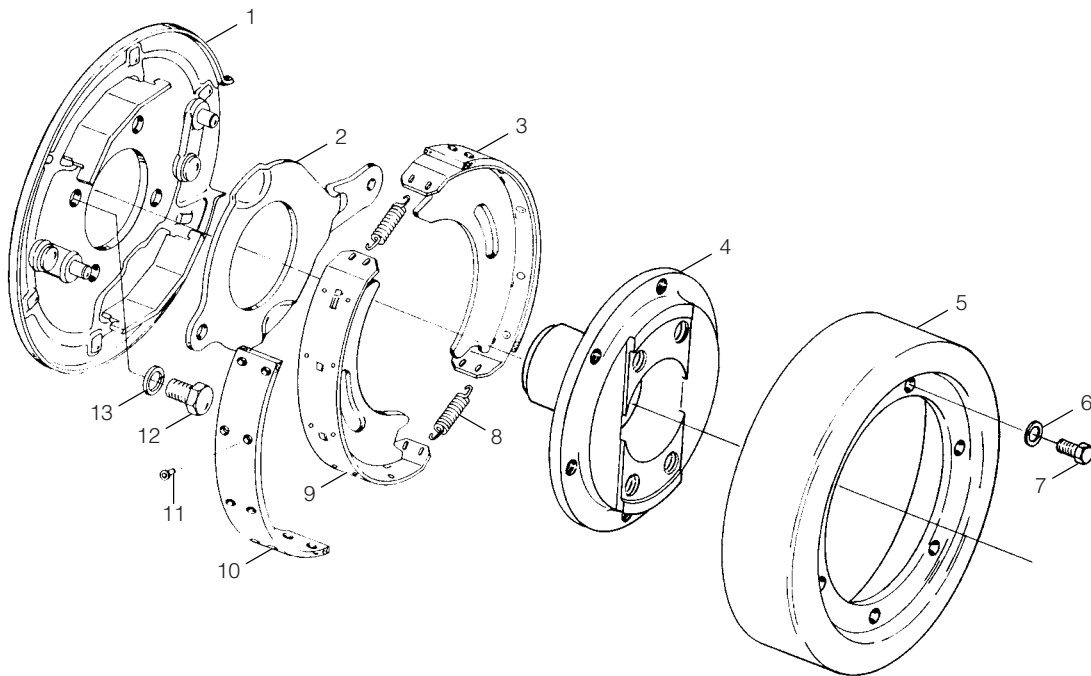
Item	Description	Quantity
1	Elbow	1
2	Forward pressure tube assembly	1
3	Elbow	1
4	Valve plug	1
5	Forward & reverse shift spool	1
6	Spool position spring	1
7	Forward & reverse shift spool	1
8	Valve housing plug	1
9	Valve spool	1
10	Control valve spring	1
11	Valve housing spool bore plug	1
12	Spool position spring	1
13	Shift spool	1
14	Spool stop	1
15	Roll pin	1
16	Spring	1
17	1st Speed shift spool	1
18	Pipe plug	2
19	Shuttle valve to electric control gasket	1
20	Port plug	1
21	Spool stop	1
22	High-low shuttle spool	1
23	Shuttle spool spring	1
24	Shuttle valve body	1
25	Pipe plug	7
26	Valve mounting screw lockwasher	2
27	Valve mounting screw	2
28	Valve mounting screw lockwasher	1
29	Valve mounting screw	1
30	Solenoid	5
31	Solenoid coil	5
32	Solenoid "O" ring	5
33	Solenoid "O" ring	5
34	Solenoid "O" ring	5
35	Control valve housing	1
36	Valve spool stop	1
37	Ground wire harness	1
38	Receptacle mounting screw	4
39	Receptacle & wire assembly	1
40	Dust cover mounting stud lockwasher	2
41	Dust cover mounting stud nut	2
42	Grommet	1
43	Dust cover	1
44	Dust cover seal	1
45	Dust cover mounting stud	2

GROUP - ELECTRIC CONTROL VALVE MOUNTING



GROUP - ELECTRIC CONTROL VALVE MOUNTING

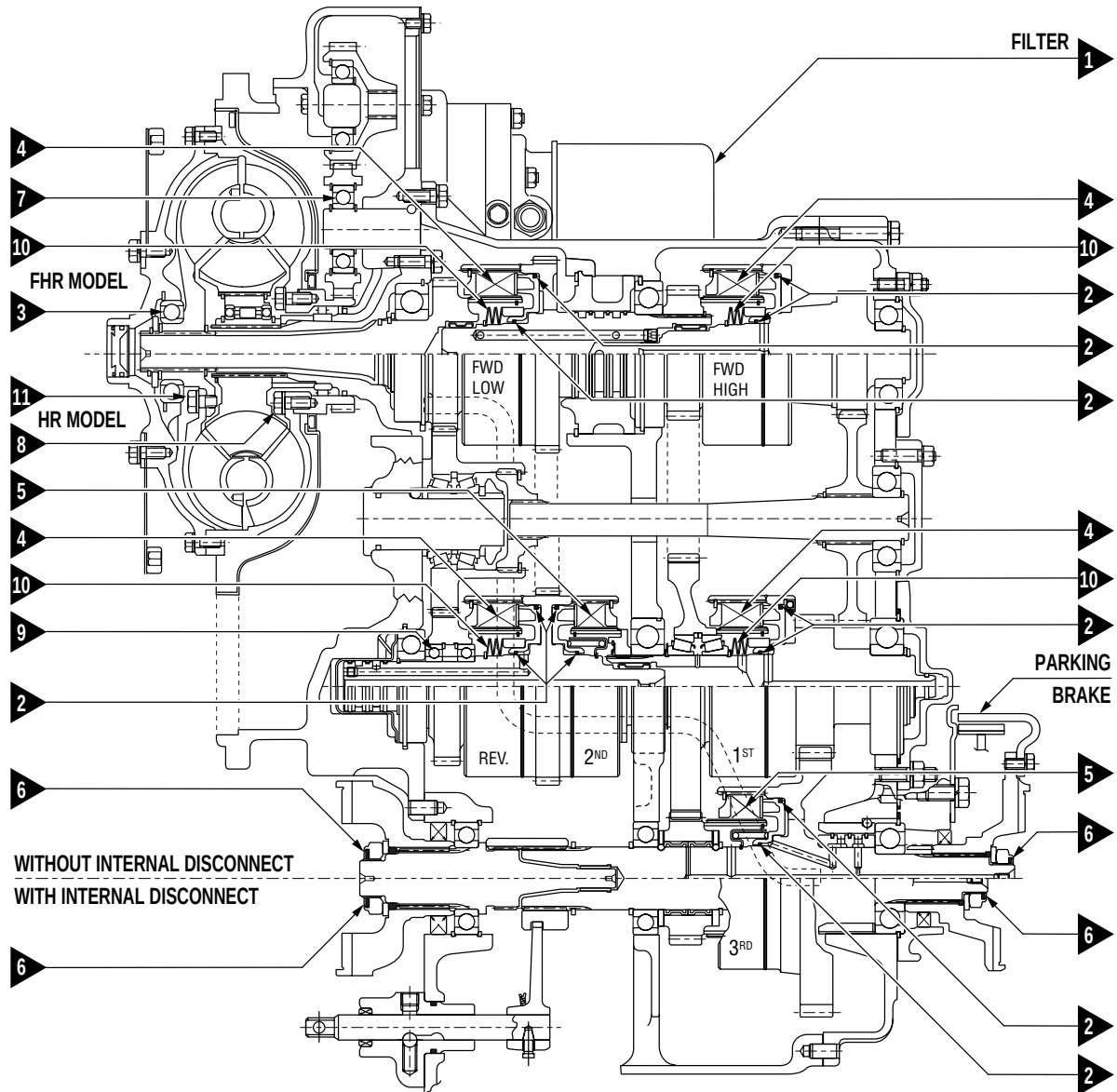
Item	Description	Quantity
1	Valve mounting screw	4
2	Valve mounting screw lockwasher	4
3	High clutch pressure "O" ring	1
4	Valve to convertor housing gasket	1
5	Control valve assembly	1
6	Valve mounting screw lockwasher	5
7	Valve mounting screw	5



GROUP - PARKING BRAKE

Item	Description	Quantity
1	Backing plate assembly	1
2	Actuating lever	1
3	Brake shoe and lining	1
4	Brake flange	1
5	Brake drum	1
6	Brake drum to flange screw lockwasher	6
7	Brake drum to flange screw	6
8	Return spring	2
9	Brake shoe, see item 3	
10	Brake lining	1
11	Brake lining rivet	20
12	Backing plate screw	4
13	Backing plate screw lockwasher	4

ASSEMBLY INSTRUCTIONS



ASSEMBLY INSTRUCTIONS

- 1 ▶ Assemble oil filter and tighten 20 to 25 lbs. ft. (27,2 - 33,8 Nm).
- 2 ▶ Teflon seals must be sized prior to assembly.
- 3 ▶ Must be loose internal fit bearing with a No. 3 etched on the bearing.
- 4 ▶ 8-outer steel plates, 8-inner friction plates. Alternately assemble, starting with outer steel plate.
- 5 ▶ 6-outer steel plates, 6-inner friction plates. Alternately assemble, starting with outer steel plate.
- 6 ▶ Tighten 200 to 250 lbs. ft. (271,2 - 338,9 Nm)
- 7 ▶ Special bearing loading notches opposite snap ring.
- 8 ▶ Bend lock tabs after tightening cap screws to proper torque.
- 9 ▶ Must be loose internal fit bearing with a No. 3 etched on the bearing. Shielded bearing. Be sure that bearing shield is on the outside.
- 10 ▶ Forward, Reverse, Fwd. High and low clutch piston return disc spring concave side of first disc spring to be placed against clutch piston wear sleeve.
Remaining four springs of each clutch to be stacked alternately reversed.
- 11 ▶ Turbine hub assembly with backing ring and special self locking screws.
Clean hub mounting surface and tapped holes with solvent.
Dry thoroughly being certain tapped holes are dry and clean.

Install backing ring and special screws to approximately .06 (1,5) of seated position.
With a calibrated torque wrench, tighten screws 37 to 41 lbs. ft. torque (50,2 - 55,6 Nm).



Notes: Assembly of turbine must be completed within a fifteen minute period from start of screw installation. The screws are prepared with a coating which begins to harden after installation in the hub holes. If not tightened to proper torque within the fifteen minute period, insufficient screw clamping tension will result.
The special screw is to be used for one installation only.
If the screw is removed for any reason it must be replaced. The compound left in the hub holes must be removed with the proper tap and cleaned with solvent. Dry hole thoroughly and use a new screw for reinstallation.



Notes: All lead in chamfers for oil seals, piston rings, and “O” rings must be smooth and free from burrs. Inspect at assembly.

Lubricate all piston ring grooves and “O” rings with oil before assembly.

Apply a thin coating of grease between seal lips on lip type seals prior to assembly.

Apply a very light coat of Permatex No. 2 to O.D. of all oil seals and bore plugs before assembly.

Apply a light coat of Loctite No. 592 to all plug threads.

Apply a light coat of Permatex No. 2 to all thru hole stud threads.

After assembly of parts using Loctite or permatex, there must not be any free or excess material which might enter the oil circuit.

**Torque Specification for lubricated
or Plated Screw Threads**

Grade 5

Grade 8

NOM. SIZE	FINE THREAD		COARSE THREAD		FINE THREAD		COARSE THREAD	
	LBS - FT	[Nm]	LBS - FT	[Nm]	LBS - FT	[Nm]	LBS - FT	[Nm]
.2500	9 - 11	[12,3 - 14,9]	8 - 10	[10,9 - 13,5]	11 - 13	[15,0 - 17,6]	9 - 11	[12,3 - 14,9]
.3125	16 - 20	[21,7 - 27,1]	12 - 16	[16,3 - 21,6]	28 - 32	[38,0 - 43,3]	26 - 30	[35,3 - 40,6]
.3750	26 - 29	[35,3 - 39,3]	23 - 25	[31,2 - 33,8]	37 - 41	[50,2 - 55,5]	33 - 36	[44,8 - 48,8]
.4375	41 - 45	[55,6 - 61,0]	37 - 41	[50,2 - 55,5]	58 - 64	[78,7 - 86,7]	52 - 57	[70,6 - 77,2]
.5000	64 - 70	[86,8 - 94,9]	57 - 63	[77,3 - 85,4]	90 - 99	[122,1 - 134,2]	80 - 88	[108,5 - 119,3]
.5625	91 - 100	[123,4 - 135,5]	82 - 90	[111,2 - 122,0]	128 - 141	[173,6 - 191,1]	115 - 127	[156,0 - 172,2]
.6250	128 - 141	[173,5 - 191,2]	113 - 124	[153,2 - 168,1]	180 - 198	[224,0 - 268,5]	159 - 175	[215,6 - 237,3]
.7500	223 - 245	[302,3 - 332,2]	200 - 220	[271,2 - 298,3]	315 - 347	[427,1 - 470,5]	282 - 310	[382,3 - 420,3]

Disassembly 18000 transmission



Figure 1
Remove drive plate screws and lockwashers.

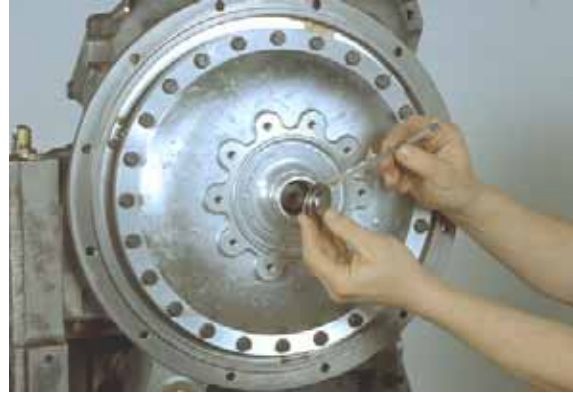


Figure 4
Remove bore plug and bore plug o-ring.



Figure 2
Remove drive plates.



Figure 5
Remove impeller cover screw and lockwasher.



Figure 3
Remove bore plug retaining ring.



Figure 6
Through bore plug hole, remove turbine retaining ring.



Figure 7
Remove impeller cover and turbine as an assembly.



Figure 10
Remove reaction member.
Note: Some units will have a fixed reaction member and some units will have a free-wheeling reaction member. Remove reaction member and freewheeling unit as an assembly. The unit shown is a fixed reaction member.



Figure 8
Remove turbine retainer ring.



Figure 11
Remove reaction member space.



Figure 9
Remove reaction member retainer ring.



Figure 12
Remove impeller and hub as an assembly.

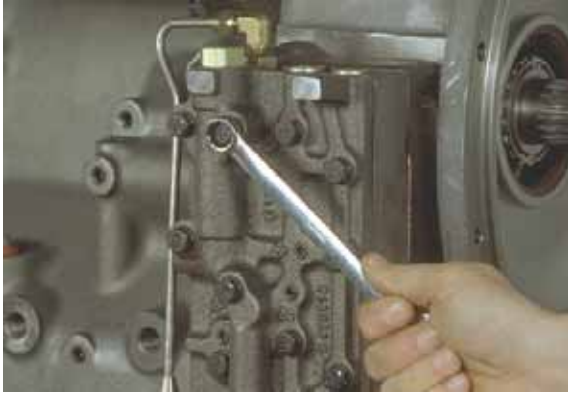


Figure 13
Remove control valve screws and lockwashers.

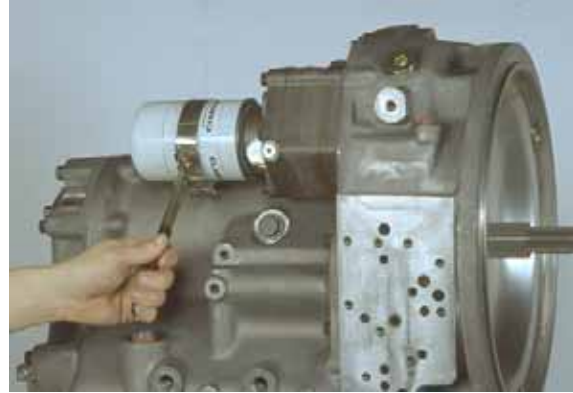


Figure 16
Loosen filter assembly. It is recommended a small pan be used to catch the oil left in the filter element. Remove filter assembly.



Figure 14
Remove control valve.



Figure 17
Remove pressure regulating valve and charging pump bolts.



Figure 15
Remove modulator valve and gaskets.



Figure 18
Remove pressure regulating valve and charging pump bolts.

Disassembly 18000 transmission



Figure 19

Using oil baffle puller holes provided, remove oil baffle. Note: Puller tool like shown can be fabricated from diagram shown in section 10.



Figure 22

Remove pump adaptor screws.



Figure 20

Remove pump hole cover bolts and lockwashers.



Figure 23

Remove pump adaptor and gasket.



Figure 21

Remove pump hole cover and gasket.



Figure 24

Remove pump drive bearing support screws and lockwashers.



Figure 25
Remove pump drive gear assembly.



Figure 28
Remove idler gear retaining ring.



Figure 26
Remove idler gear retaining ring.



Figure 29
Remove charging pump drive gear screws and lockwashers.



Figure 27
Remove idler gear and bearing assembly.



Figure 30
Remove charging pump drive gear and bearing assembly.



Figure 31

Remove front output flange nut, washer and o-ring.



Figure 34

Support converter housing with a chain hoist. Separate converter housing from transmission case assembly. Note: Reverse and 2nd clutch will remain in converter housing.



Figure 32

Remove sump screen assembly.



Figure 35

Remove dipstick tube retainer clip screws and lockwasher.



Figure 33

Remove bolts securing transmission case to converter housing.



Figure 36

Remove dipstick tube retainer screws and lockwashers.



Figure 37
Remove dipstick tube, clip and o-ring.



Figure 40
Remove fwd-hi shaft bearing cap nuts and lockwashers.



Figure 38
Remove fwd-hi drive shaft bearing cap nuts and lockwashers.



Figure 41
Remove fwd-hi shaft bearing cap and gasket.



Figure 39
Remove fwd-hi drive shaft bearing cap and gasket.



Figure 42
Remove low shaft bearing cap nuts and lockwashers.



Figure 43
Remove low shaft bearing cap and o-rings.



Figure 46
Remove fwd-high drive shaft rear bearing retaining ring.



Figure 44
Remove output shaft rear bearing cap screws and lockwashers.



Figure 47
Remove fwd-hi shaft rear bearing retaining ring.



Figure 45
Remove output shaft rear bearing cap and gasket.



Figure 48
Remove low shaft rear bearing retaining ring.

Disassembly 18000 transmission



Figure 49

Remove rear cover bolts and lockwasher.



Figure 52

Remove rear cover from transmission case.
All drums and shafts remain in transmission case.



Figure 50

Using pry slots provided, pry cover from transmission housing, tapping on clutch and output shaft to allow cover to be removed without shaft binding.
Note: The use of alignment studs will facilitate cover removal. Output shaft rear bearing remains in rear cover.



Figure 53

Remove fwd-hi drive shaft assembly.



Figure 51

Remove output shaft nut, washer and sleeve.



Figure 54

Remove fwd-hi drum and needle bearing.



Figure 55
Remove low clutch rear bearing snap ring.

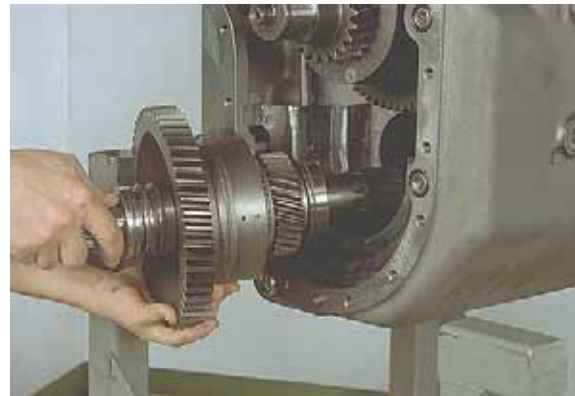


Figure 58
Remove output shaft and 3rd clutch assembly.



Figure 56
Remove low clutch rear bearing spacer.

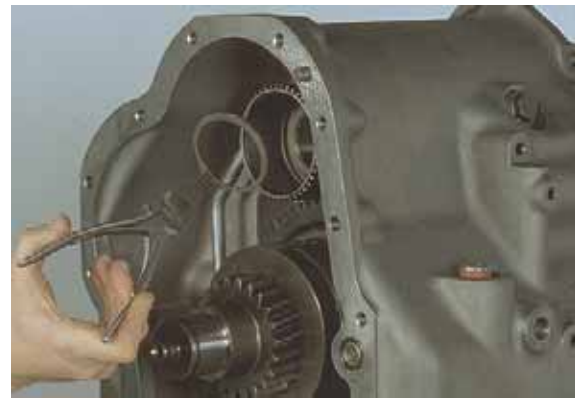


Figure 59
Remove fwd-hi clutch hub retaining ring.



Figure 57
Use bearing puller to remove low clutch rear bearing.



Figure 60
Remove fwd-hi clutch hub.



Figure 61
Remove low clutch assembly.



Figure 64
Remove forward clutch oil sealing ring sleeve retainer ring.



Figure 62
Tap forward clutch assembly from bearing.



Figure 65
Tap forward clutch bearing and sleeve from housing.



Figure 63
Remove forward clutch assembly and front needle bearing.



Figure 66
Sleeve and bearing removed.



Figure 67
Tap front output shaft from housing.



Figure 70
Remove output shaft front bearing and retaining rings.



Figure 68
Front output shaft and bushing removed.



Figure 71
Remove suction tube mounting screws and lockwashers.



Figure 69
Remove front output shaft oil seal.



Figure 72
Suction tube and o-ring removed.

Disassembly 18000 transmission



Figure 73

Remove oil baffle screws and lockwashers.

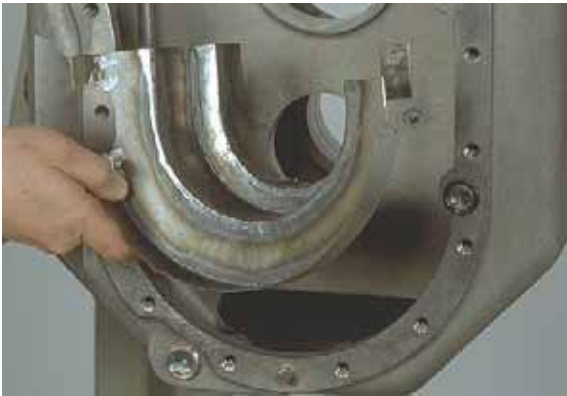
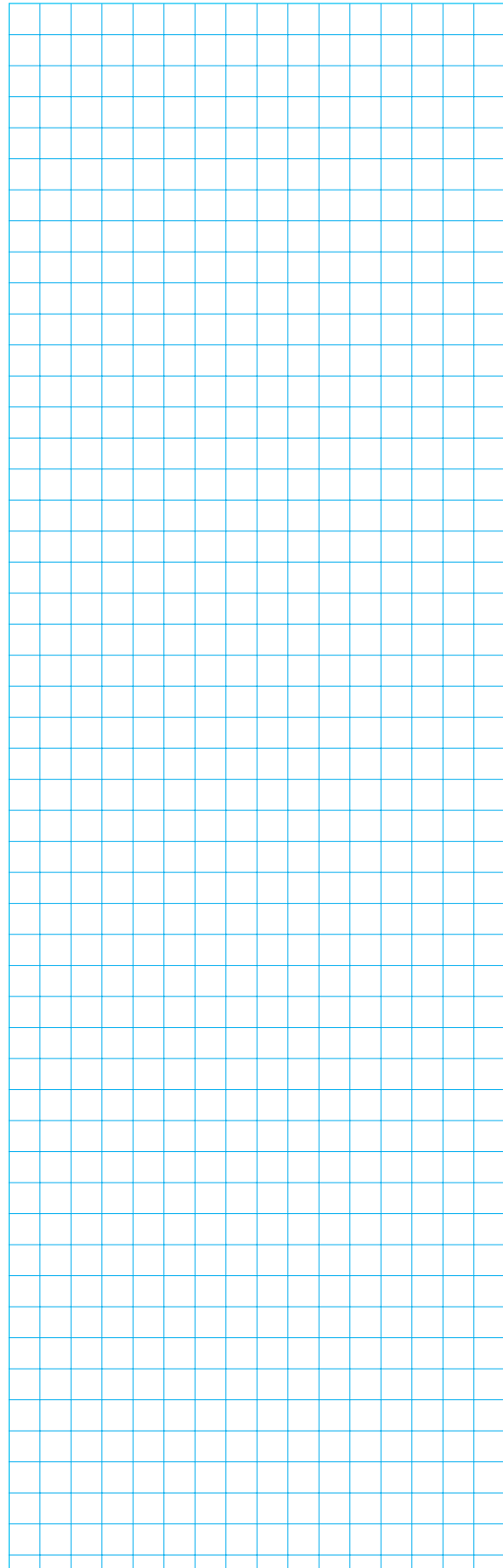
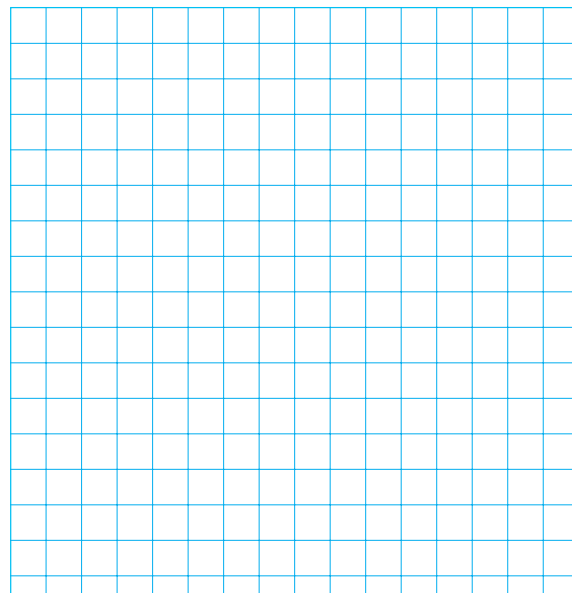


Figure 74

Oil baffle removed.



Disassembly of converter housing



Figure 75

Spread reverse clutch front bearing locating ring.
Pry reverse and 2nd clutch from housing.



Figure 78

Remove drive adaptor.



Figure 76

Using spreading type snap ring pliers, spread
turbine shaft bearing locating ring.
Tap turbine shaft and bearing from stator support.



Figure 79

Unclench lock nut by straightening upset metal in
notch in idler shaft.
Remove nut and spacer.



Figure 77

Remove drive adaptor snap ring.



Figure 80

Remove idler gear and outer taper bearing from idler
shaft.

Disassembly of converter housing



Figure 81
Remove bearing spacer.



Figure 84
Tap idler shaft from housing, use caution as not to loose shaft lock ball.



Figure 82
Use bearing puller to remove inner taper bearing.



Figure 85
Idler shaft, lock ball and o-ring removed.



Figure 83
Inner taper bearing and spacer removed.



Figure 86
Remove stator support screws.

Disassembly of converter housing



Figure 87

Tap stator support from housing. Remove support.



Figure 90

Remove turbine shaft oil seal ring.

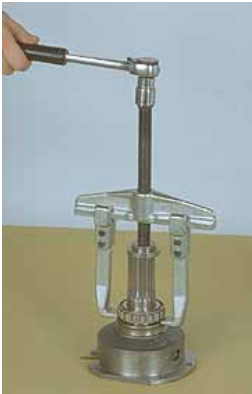


Figure 88

Use bearing puller to remove impeller hub bearing. Remove support oil sealing ring and ring expander spring.

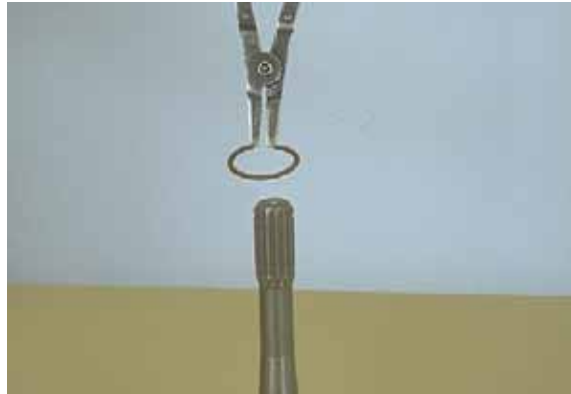


Figure 91

Remove turbine shaft bearing retainer ring.



Figure 89

Install new sealing ring and expander spring on support. Expander spring gap to be 180° from sealing ring hook joint. Press support bearing into position. Note: Bearing part number must be up.



Figure 92

Remove turbine shaft bearing washer.

Disassembly of converter housing



Figure 93
Pry bearing from turbine shaft.



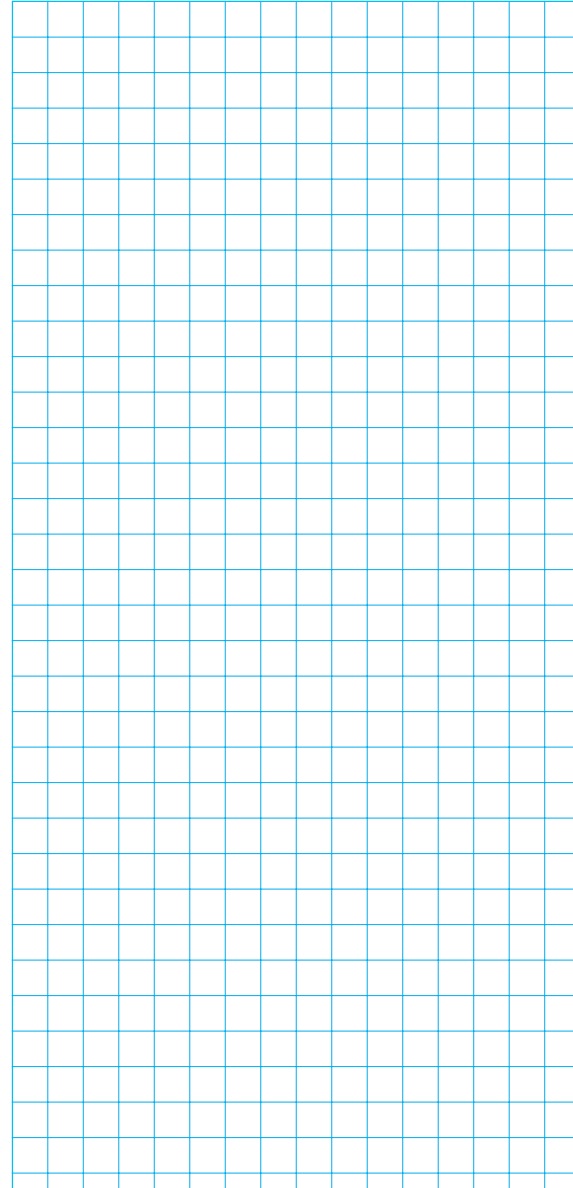
Figure 96
Install turbine shaft oil seal ring.



Figure 94
Install turbine shaft bearing on shaft.
Tap bearing into place.
Note: Bearing locating ring must be down.



Figure 95
Install bearing washer and retainer ring.



Reassembly of converter housing



Figure 97

Position support in converter housing aligning holes in support with holes in housing. Tap support into position.



Figure 100

With new o-ring on shaft, position idler shaft and lock ball in converter housing. Tap shaft into position.



Figure 98

Install support washer and bolts. Tighten to specified torque.



Figure 101

Position shaft lock ball in shaft.



Figure 99

Spread ears on turbine shaft bearing retainer ring located in reaction member support. Tap turbine shaft and bearing into position, being certain bearing snap ring is in full position in snap ring groove.



Figure 102

Place bearing spacer on shaft.

Reassembly of converter housing



Figure 103

Install idler gear inner taper bearing on shaft with large diameter of taper down.



Figure 106

Install outer taper bearing on shaft with large diameter of taper out.



Figure 104

Position bearing spacer on shaft.



Figure 107

Place outer bearing spacer on shaft.



Figure 105

Place idler gear and taper bearing cup assembly on bearing with hub gear up.



Figure 108

Install lock nut.

Reassembly of converter housing



Figure 109

Tighten nut 200 to 250 Ft.Lbs torque (271,2 - 338,9 N.m).



Figure 112

Install drive adaptor retainer ring.



Figure 110

Stake nut securely in shaft notch.



Figure 113

Position charging pump drive gear and install capscrews.



Figure 111

Install drive adaptor in reverse idler gear.



Figure 114

Tighten capscrews to specified torque.

Reassembly of converter housing



Figure 115

If pump idler gear locating ring was removed, install ring in inner ring groove.



Figure 118

Position auxiliary pump drive gear and install capscrews.



Figure 116

Position idler gear and bearing assembly on shaft.



Figure 119.

Tighten pump drive capscrews to specified torque.



Figure 117

Install gear assembly retainer ring.

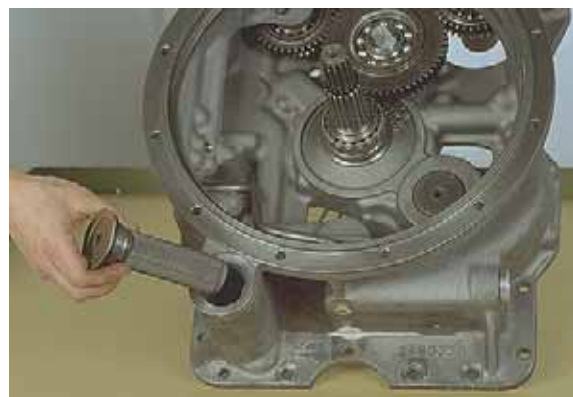


Figure 120.

Install oil screen assembly and tighten 10 to 15 Ft. Lbs. torque (13,6 - 20,3 N.m).

Disassembly of forward clutch



Figure 121
Remove forward shaft oil seal rings.



Figure 124
Remove inner and outer discs.



Figure 122
Remove end plate retainer ring.



Figure 125
Remove return spring (belleville washer) retainer ring.



Figure 123
Remove end plate.



Figure 126
Remove belleville washer springs.

Disassembly of forward clutch



Figure 127

Remove piston return spring spacer.



Figure 128

Remove clutch piston.

Reassembly of forward clutch



Figure 129

Install clutch piston outer seal ring. Note: Ring must be sized before installing in clutch drum. Sizing is best accomplished by rotating piston while holding a round object against the new seal ring. Rotate piston until seal ring is flush with diameter of piston.



Figure 132

Install belleville washers. First washer with large diameter of bevel toward spacer. Alternate five (5) washers.



Figure 130

Install clutch piston inner sealing ring. Position piston in clutch drum, use cautions as not to damage inner and outer piston sealing rings.

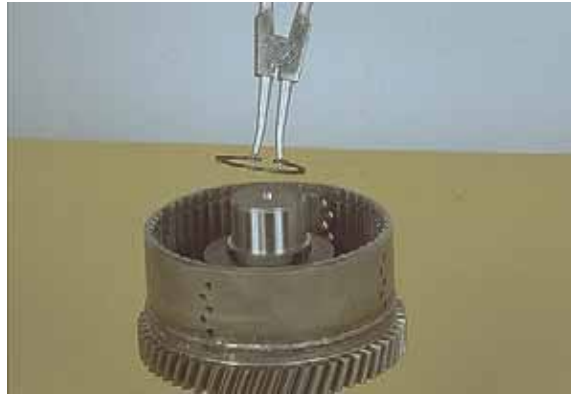


Figure 133

Install return spring retainer ring.



Figure 131

Install piston return spring spacer.



Figure 134

Tap retainer ring into groove.



Figure 135
Install one stell disc.



Figure 138
Install end plate retainer ring.



Figure 136
Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.



Figure 139
Install clutch shaft sealing rings. Expander spring gap to be 180° from sealing ring hook joint.



Figure 137
Install end plate.

Disassembly of forward high clutch



Figure 140
Remove backing plate snap ring.



Figure 143
Remove return spring (belleville washers) retainer ring.



Figure 141
Remove backing plate.



Figure 144
Remove belleville washer springs.



Figure 142
Remove inner and outer discs.



Figure 145
Remove piston return spacer.

Disassembly of forward high clutch



Figure 146
Remove clutch piston.



Figure 147
Remove rear bearing retainer ring.



Figure 148
Use bearing puller to remove rear bearing.



Figure 149

Tap rear bearing into place with snap ring groove up.



Figure 152

Install clutch piston inner seal ring. Position piston in clutch drum, use caution as not to damage inner and outer piston sealing rings.

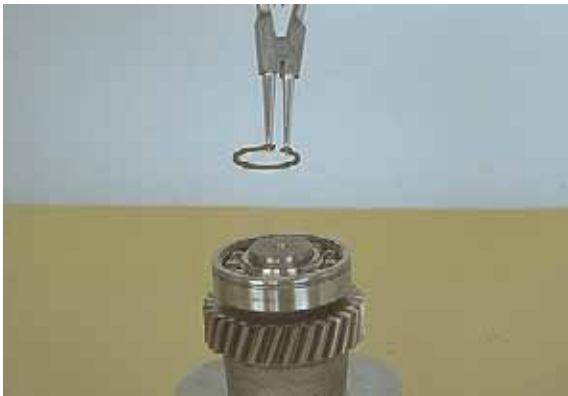


Figure 150

Install rear bearing retainer ring.



Figure 153

Install piston return spacer.

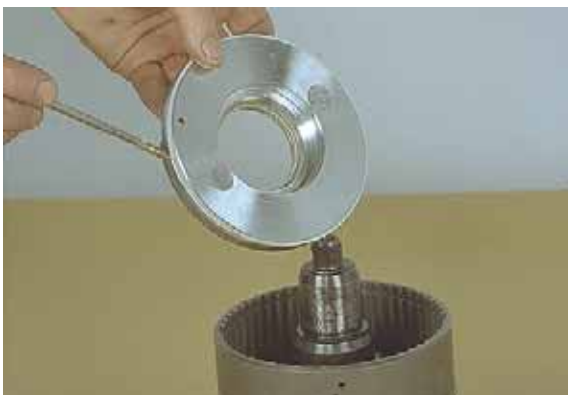


Figure 151

Install clutch piston outer seal ring.
Note: Ring must be sized before installing in clutch drum. Sizing is best accomplished by rotating piston while holding a round object against the new seal ring. Rotate piston until seal ring is flush with outer diameter of piston.



Figure 154

Install Belleville washers. First washer with large diameter of bevel toward spacer. Alternate five (5) washers.



Figure 155
Install return spring retainer ring.



Figure 158
Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.

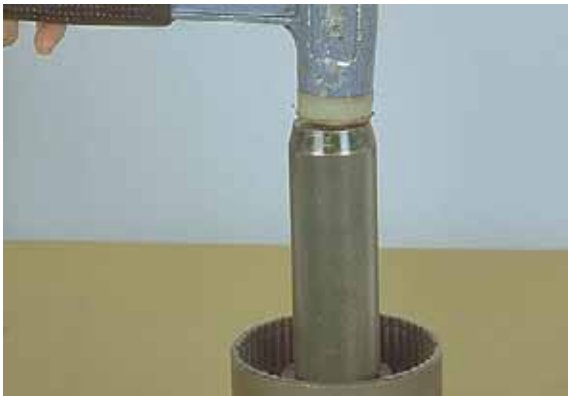


Figure 156
Tap retainer ring into groove.



Figure 159
Install backing plate.



Figure 157
Install one steel disc.

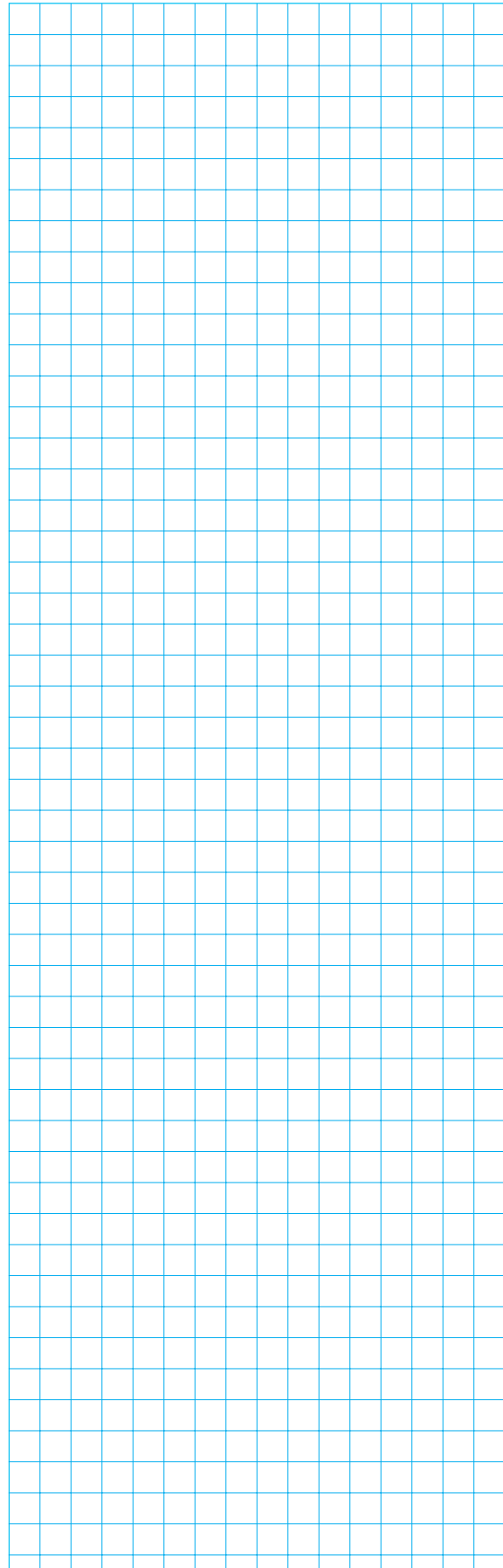
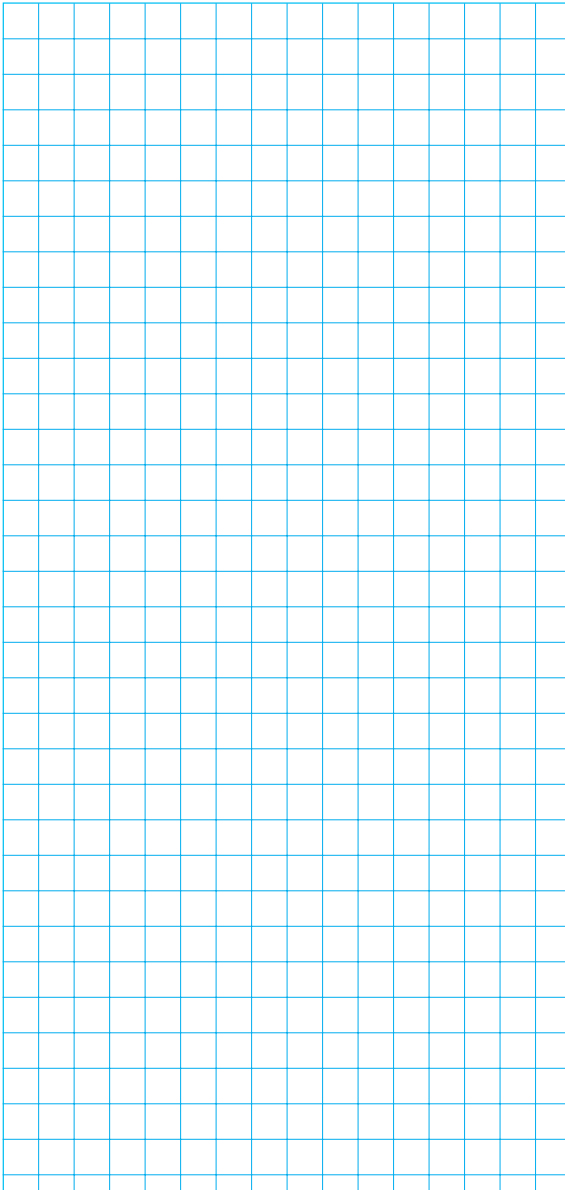


Figure 160
Install backing plate snap ring.

Reassembly of forward high clutch



Figure 161
Install clutch shaft sealing ring.



Disassembly of low clutch



Figure 162
Remove snap ring retainer snap ring.



Figure 165
Remove 2nd clutch disc hub.



Figure 163
Remove snap ring retainer.



Figure 166
Use bearing puller to remove clutch shaft front bearing.



Figure 164
Remove 2nd clutch disc hub snap ring.



Figure 167
Remove snap ring retainer.

Disassembly of low clutch



Figure 168
Remove clutch gear outer bearing snap ring.



Figure 171
Remove backing plate snap ring.



Figure 169
Use bearing puller to remove clutch gear and outer bearing cone.



Figure 172
Remove backing plate.



Figure 170
Remove taper bearing spacer.



Figure 173
Remove inner and outer discs.

Disassembly of low clutch



Figure 174

Use bearing puller to remove clutch gear inner bearing cone.



Figure 177

Remove belleville washer springs.



Figure 175

Remove return spring (belleville washer) retainer ring.



Figure 178

Remove piston return spacer.



Figure 176

Remove retainer ring retainer.



Figure 179

Remove clutch piston.

Reassembly of low clutch



Figure 180

Install clutch piston outer seal ring.
Note: Ring must be sized before installing in clutch drum.
Sizing is best accomplished by rotating piston while holding a round object against the new seal ring. Rotate piston until seal ring is flush with outer diameter of piston.



Figure 183

Install Belleville washers. First washer with large diameter of bevel toward spacer. Alternative five (5) washers.



Figure 181

Install clutch piston inner sealing ring.
Position piston in clutch drum, use caution as not to damage inner and outer piston seal rings.



Figure 184

Install snap ring retainer.



Figure 182

Install piston return spring spacer.



Figure 185

Install return spring washer retainer ring.



Figure 186
Tap retainers ring into groove.



Figure 189
Install backing plate.



Figure 187
Install one steel disc.

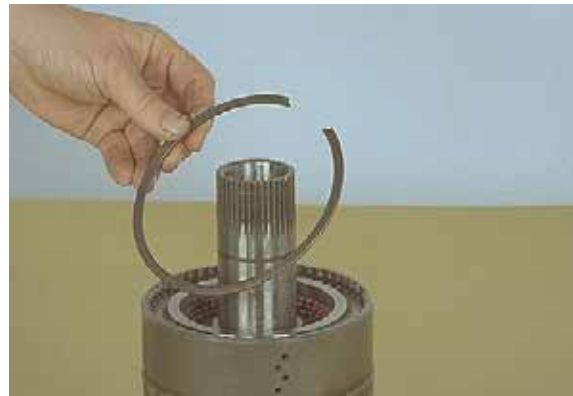


Figure 190
Install backing plate snap ring.



Figure 188
Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.



Figure 191
Install inner bearing cone with large diameter of taper down.



Figure 192
Tap bearing cone into place.



Figure 195
Install outer bearing cone with large diameter of taper out.



Figure 193
Install taper bearing spacer.



Figure 196
Tap clutch gear outer bearing cone.



Figure 194
Install clutch gear into drum. Align splines on clutch gear with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.



Figure 197
Install clutch gear outer bearing retainer ring.



Figure 198
Install retainer ring retainer.



Figure 201
Install 2nd clutch disc hub.



Figure 199
Install clutch drum front bearing with snap ring groove down.



Figure 202
Install 2nd clutch disc hub retainer ring.



Figure 200
Tap bearing into place.



Figure 203
Install 2nd clutch disc hub retainer ring retainer.

Reassembly of low clutch



Figure 204
Install retainer snap ring.



Figure 205
Install low clutch shaft sealing ring.

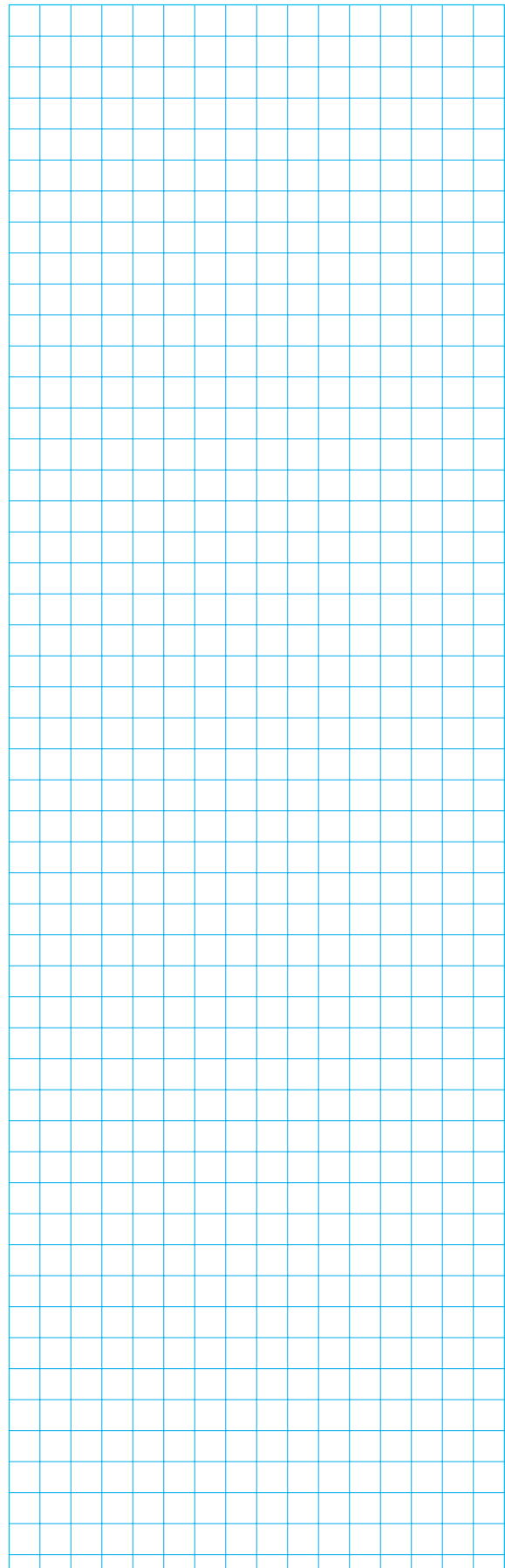
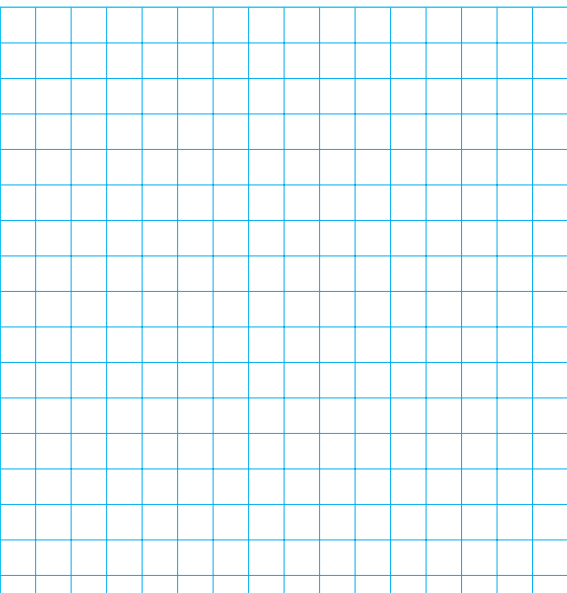




Figure 206
Remove end plate snap ring.



Figure 209
Remove piston return spring snap ring.



Figure 207
Remove end plate.



Figure 210
Remove piston return spring retainer.



Figure 208
Remove inner and outer discs.

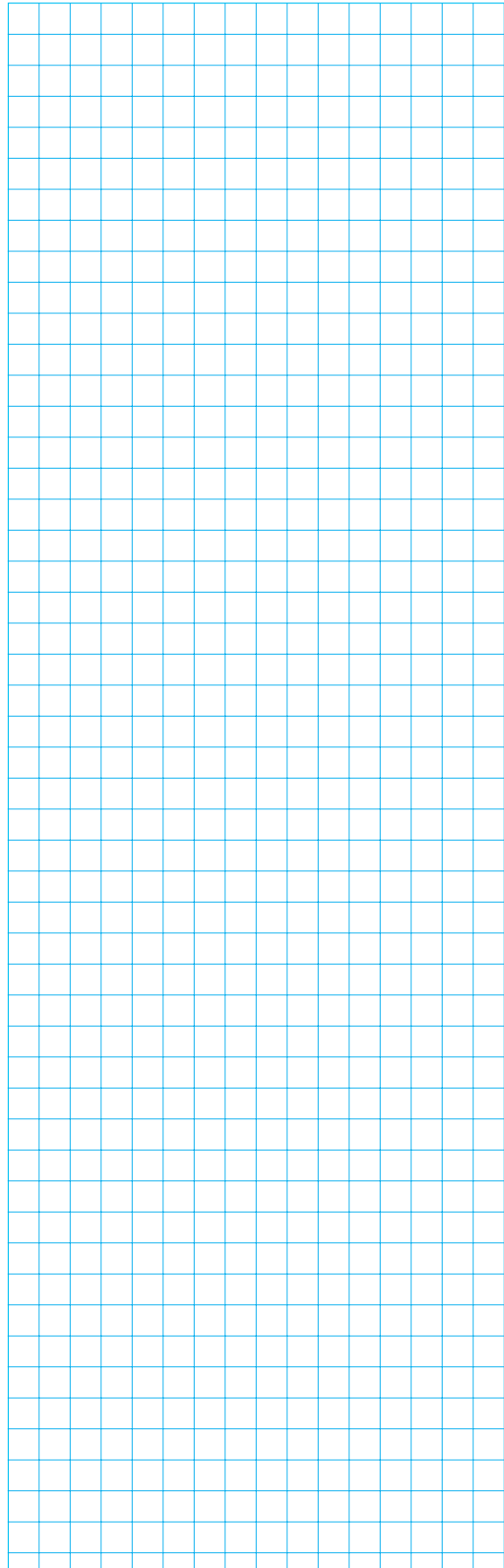
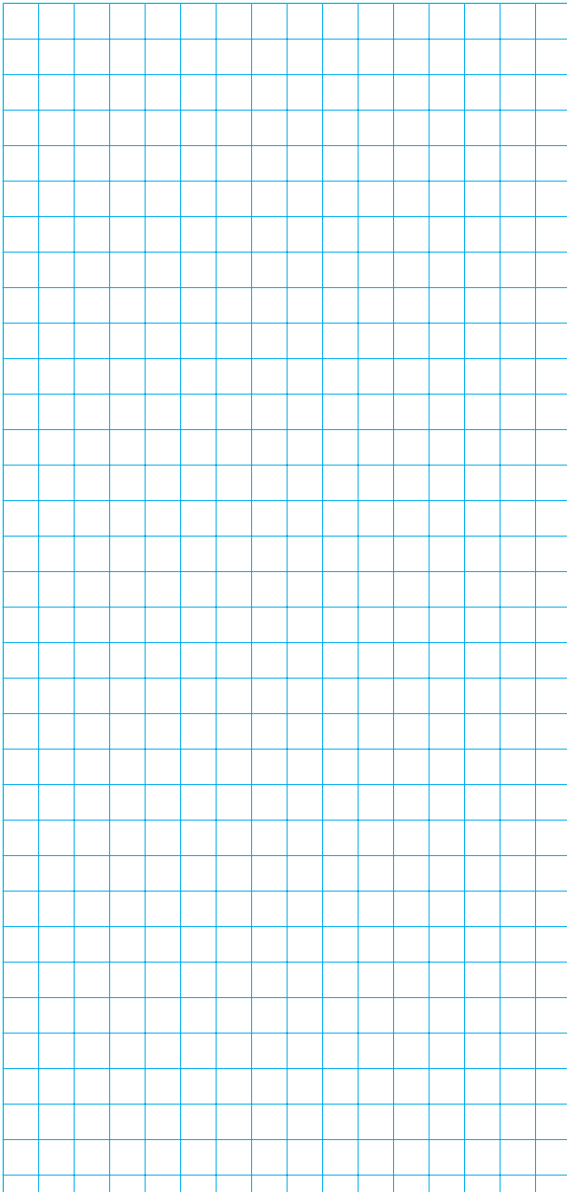


Figure 211
Remove piston return spring.

Disassembly 2nd clutch



Figure 212
Remove clutch piston assembly.



Disassembly of reverse clutch



Figure 213
Remove clutch shaft sealing rings.



Figure 216
Use bearing puller to remove clutch gear and outer bearing.



Figure 214
Remove front bearing retaining ring.



Figure 217
Remove clutch gear bearing spacer.



Figure 215
Use bearing puller to remove front bearing.



Figure 218
Remove backing plate snap ring.

Disassembly of reverse clutch



Figure 219
Remove backing plate.



Figure 222
Remove return spring (belleville washer) retainer ring.



Figure 220
Remove inner and outer discs.



Figure 223
Remove belleville washer spring.



Figure 221
Use bearing puller to remove clutch gear inner bearing.

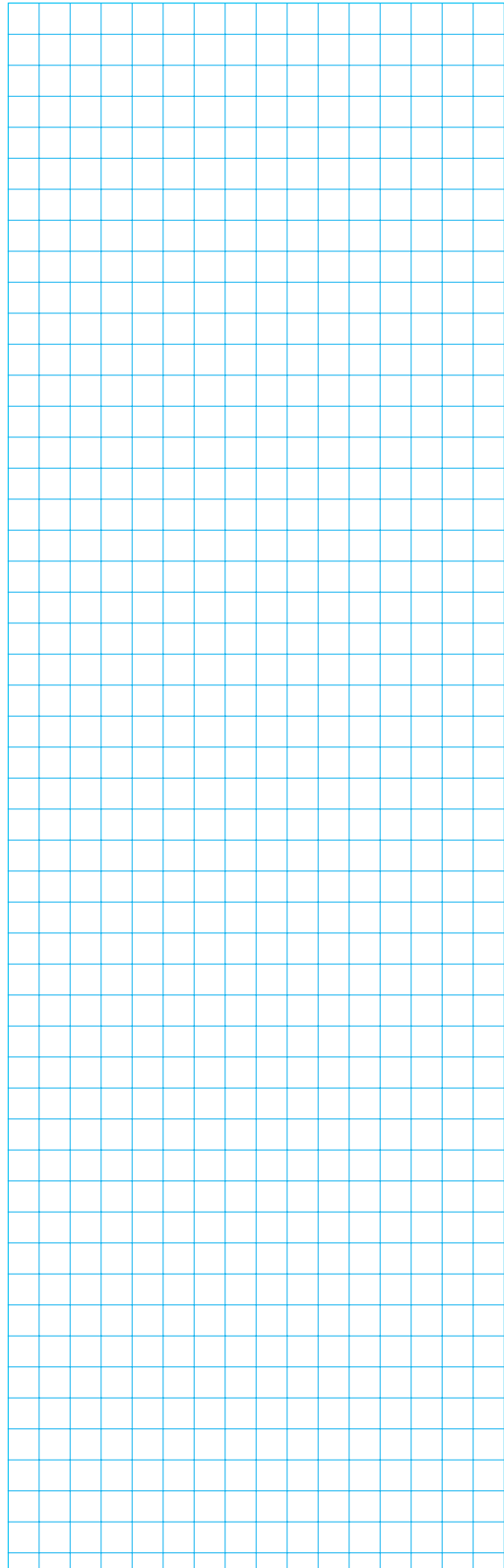
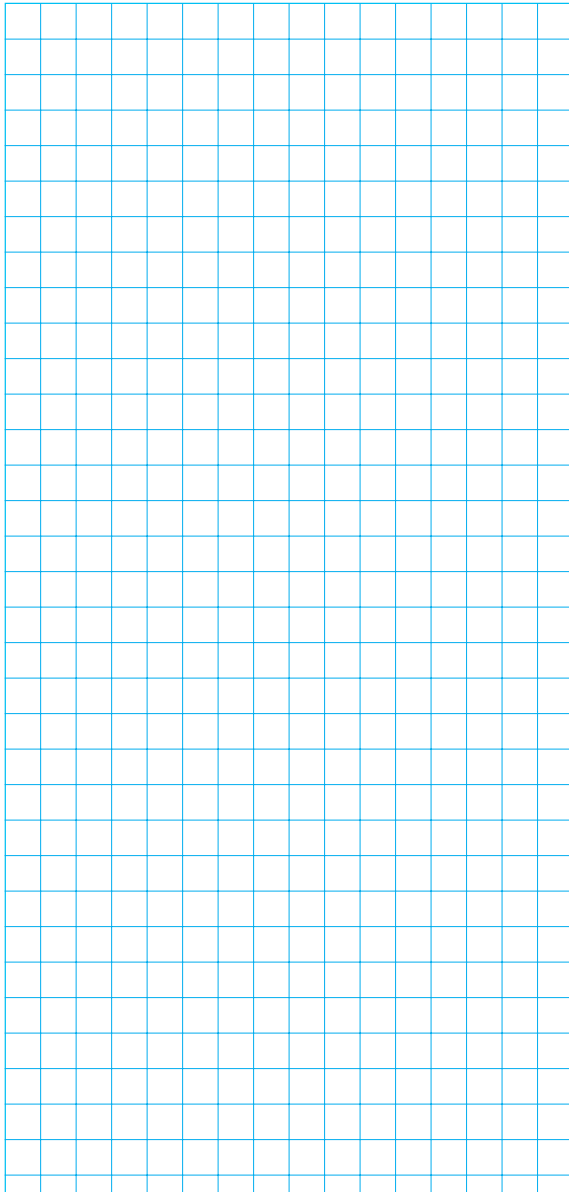


Figure 224
Remove piston return spring spacer.

Disassembly of reverse clutch



Figure 225
Remove clutch piston.



Reassembly of the 2nd clutch



Figure 226

Install clutch piston outer seal ring.

Note: Ring must be sized before installing in clutch drum. Sizing is best accomplished by rotating piston while holding a round object against the new seal ring. Rotate piston unit seal ring is flush with outer diameter of piston..



Figure 229

Install clutch piston return spring retainer.



Figure 227

Install clutch piston inner seal ring. Position piston in clutch drum. Use caution as not to damage inner and outer piston sealing ring.



Figure 230

Install spring retainer snap ring.



Figure 228

Install clutch piston return spring.



Figure 231

Tap snap ring into groove.

Reassembly of the 2nd clutch



Figure 232
Install one steel disc.



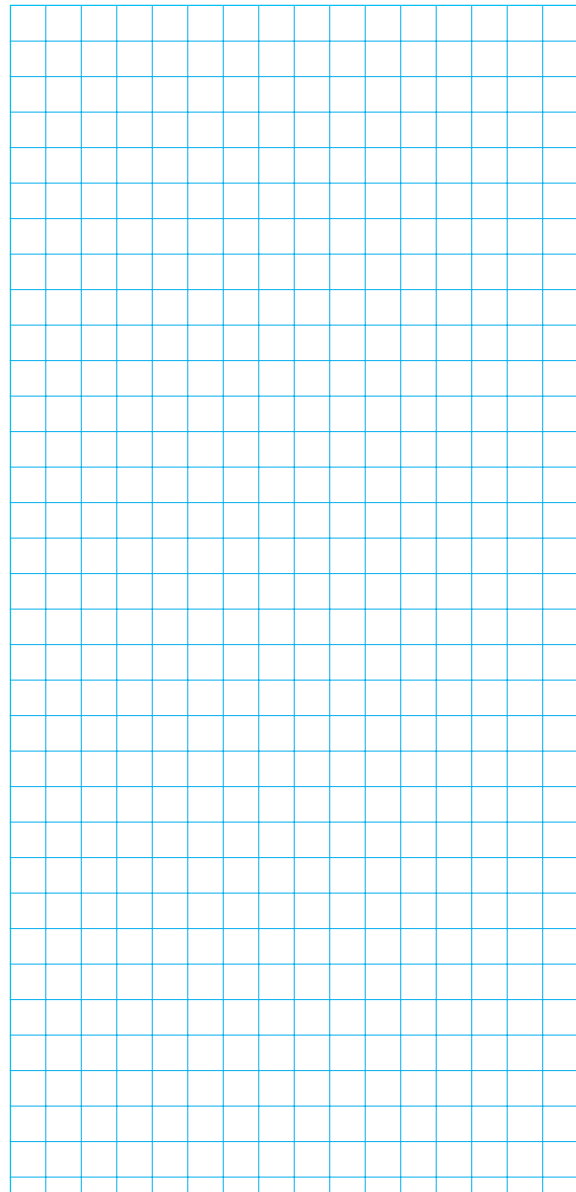
Figure 235
Install backing plate snap ring.



Figure 233
Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.



Figure 234
Install backing plate.



Reassembly of reverse clutch



Figure 236

Install clutch piston outer seal ring.

Note: Ring must be sized before installing in clutch drum. Sizing is best accomplished by rotating piston while holding a round object against the new seal ring. Rotate piston until seal ring is flush with outer diameter of piston.



Figure 239

Install Belleville washers. First washer with large diameter of bevel toward spacer. Alternate five (5) washers.



Figure 237

Install clutch piston inner seal ring. Position piston in clutch drum, use caution as not to damage inner and outer piston sealing rings.



Figure 240

Install return spring washer retainer ring.



Figure 238

Install piston return spring spacer.



Figure 241

Tap retainer ring into groove.

Reassembly of reverse clutch



Figure 242
Install one steel disc.



Figure 245
Install end plate retainer ring.



Figure 243
Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.



Figure 246
Install clutch gear inner bearing.



Figure 244
Install end plate.



Figure 247
Tap inner bearing into place.



Figure 248
Install clutch gear bearing spacer.



Figure 251
Tap outer bearing into clutch gear.



Figure 249
Install clutch gear into drum. Align splines on clutch gear with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.



Figure 252
Install clutch shaft front bearing with sap ring groove up.



Figure 250
Install clutch gear outer bearing.
Note: Outer bearing has a shield in it, this shield must be up.



Figure 253
Tap bearing into position.

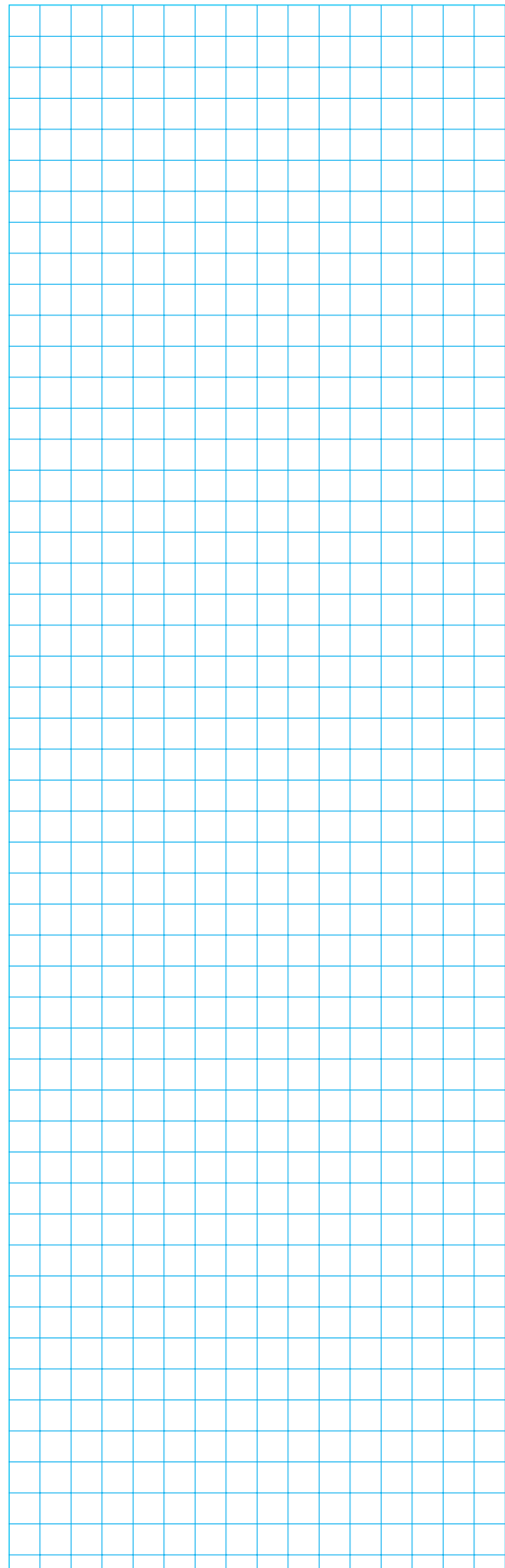
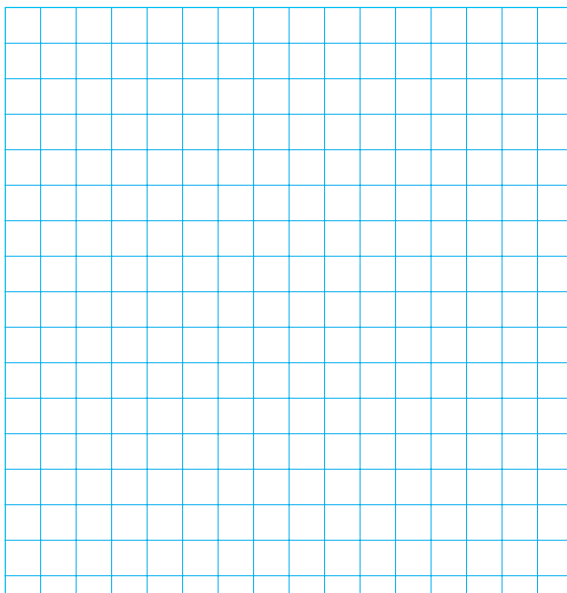
Reassembly of reverse clutch



Figure 254
Install front bearing retainer ring.



Figure 255
Install clutch shaft sealing rings.



Disassembly of output shaft & 3rd clutch

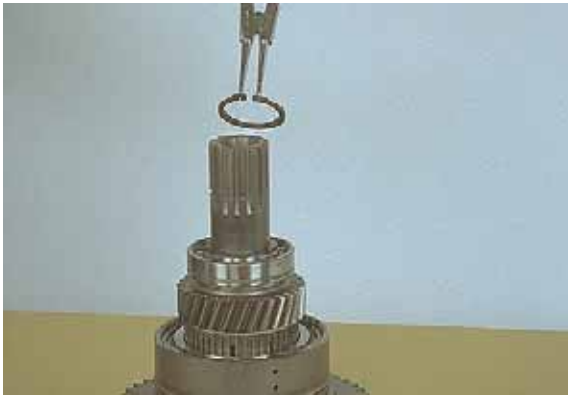


Figure 256
Remove drive sleeve retaining ring.



Figure 259
Remove bearing spacer.



Figure 257
Remove front bearing retaining ring.



Figure 260
Remove bearing spacer lock ball.



Figure 258
Use bearing puller to remove shaft front bearing.



Figure 261
Remove 3rd clutch gear.

Disassembly of output shaft & 3rd clutch



Figure 262

Remove 3rd clutch gear bearings (2 x needle bearings).



Figure 265

Remove bearing spacer retaining ring.



Figure 263

Remove bearing spacer.



Figure 266

Remove backing plate snap ring.



Figure 264

Remove bearing spacer lock ball.



Figure 267

Remove backing plate.

Disassembly of output shaft & 3rd clutch



Figure 268
Remove inner and outer discs.



Figure 271
Remove piston return spring.



Figure 269
Remove piston return spring retainer snap ring.



Figure 272
Remove clutch piston.



Figure 270
Remove spring retainer.



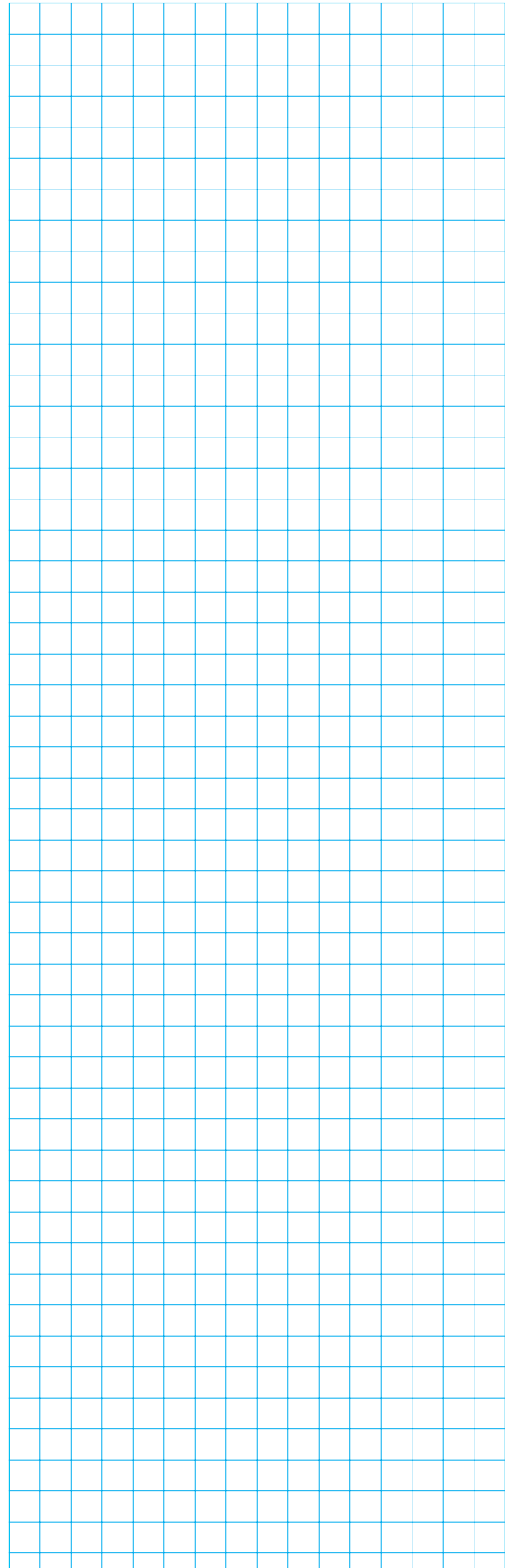
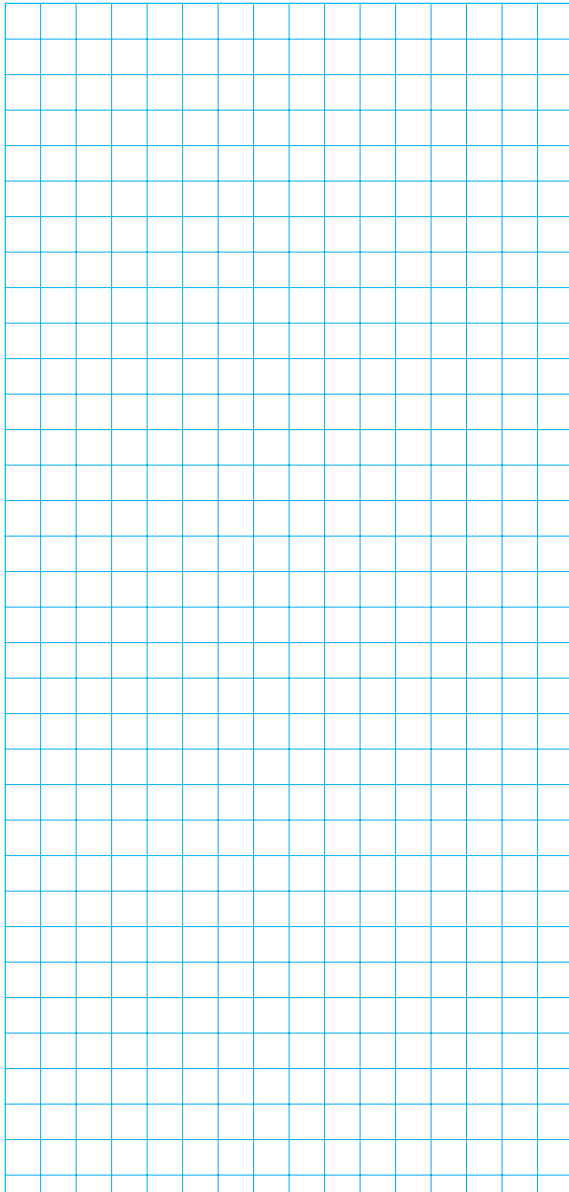
Figure 273
Remove distributor sleeve oil sealing rings.

Disassembly of output shaft & 3rd clutch



Figure 274

Remove distributor sleeve.



Reassembly of output shaft 3rd clutch



Figure 275

Install distributor sleeve. Tap sleeve into place.



Figure 278

Install clutch piston inner seal ring. Position piston in clutch drum; use caution as not to damage inner and outer piston sealing rings.



Figure 276

Install distributor sleeve sealing rings. Expander spring gap to be 180° from sealing ring hook joint.



Figure 279

Install piston return spring.



Figure 277

Install clutch piston outer sealing ring.
Note: Ring must be sized before installing in clutch drum. Sizing is best accomplished by rotating piston while holding a round object against the new seal ring. Rotate piston until seal ring is flush with outer diameter of piston.



Figure 280

Install piston return spring retainer.

Reassembly of output shaft 3rd clutch



Figure 281
Install piston return spring snap ring.



Figure 284
Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.



Figure 282
Tap snap ring into groove.



Figure 285
Install backing plate.



Figure 283
Install one steel disc.



Figure 286
Install backing plate snap ring.



Figure 287
Install bearing spacer retainer ring.



Figure 290
Install clutch gear needle bearings.



Figure 288
Install bearing spacer lock ball.



Figure 291
Install clutch gear into drum. Align splines on clutch gear with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.



Figure 289
Install bearing spacer with oil grooves up.



Figure 292
Install bearing spacer lockball.



Figure 293
Install bearing spacer with oil grooves down.



Figure 296
Install front bearing retaining ring.



Figure 294
Install clutch shaft front bearing with snap ring groove down.



Figure 297
Install drive sleeve retaining ring.



Figure 295
Tap bearing into place.



Figure 298
If the output shaft front bushing was changed, install a new bushing.

Disassembly of forward high drive shaft



Figure 299
Remove drive shaft rear bearing retaining ring.

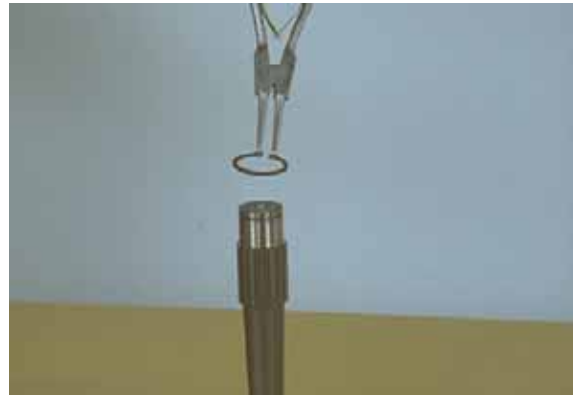


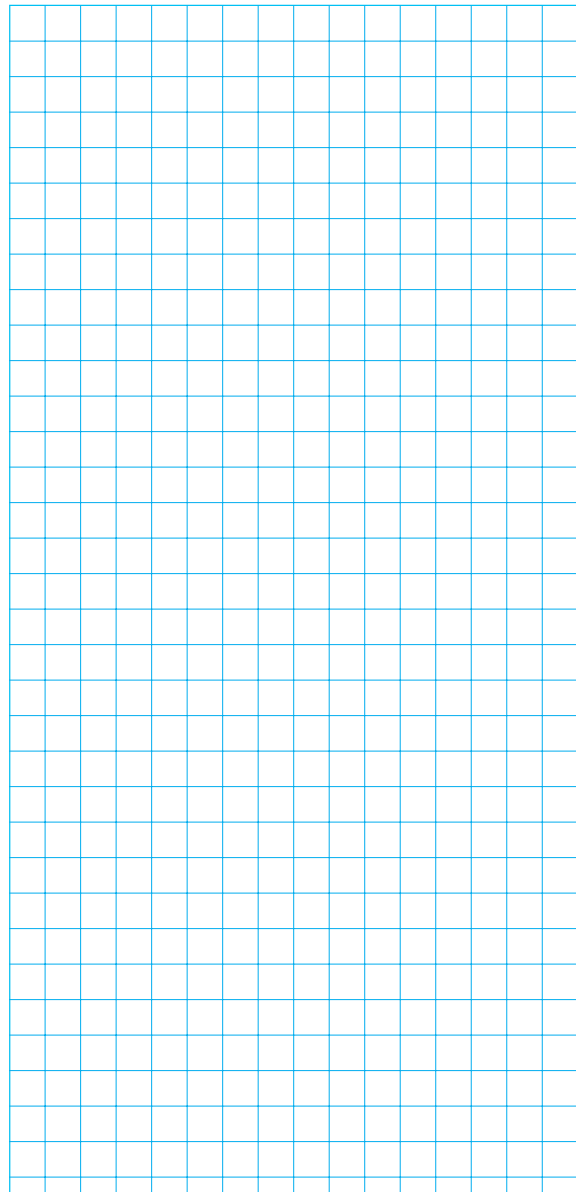
Figure 302
Remove forward high drive gear retainer ring.



Figure 300
Use bearing puller to remove rear bearing.



Figure 301
Remove forward high drive gear.



Reassembly of forward high drive shaft

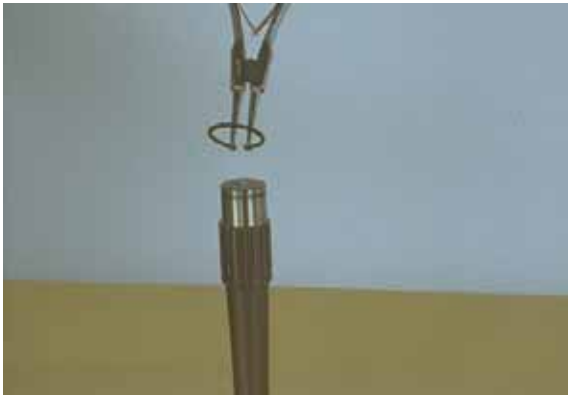


Figure 303
Install forward high drive gear retainer ring.



Figure 306
Tap bearing into place.



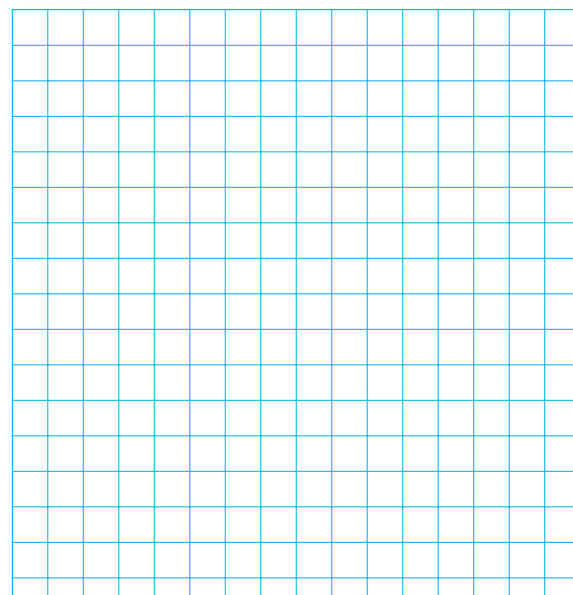
Figure 304
Install forward high drive gear.



Figure 307
Install bearing retaining ring.



Figure 305
Install drive shaft bearing with snap ring groove up.



Disassembly of rear cover



Figure 308

Remove 3rd distributor sleeve.



Figure 309

Remove distributor sleeve lockball.

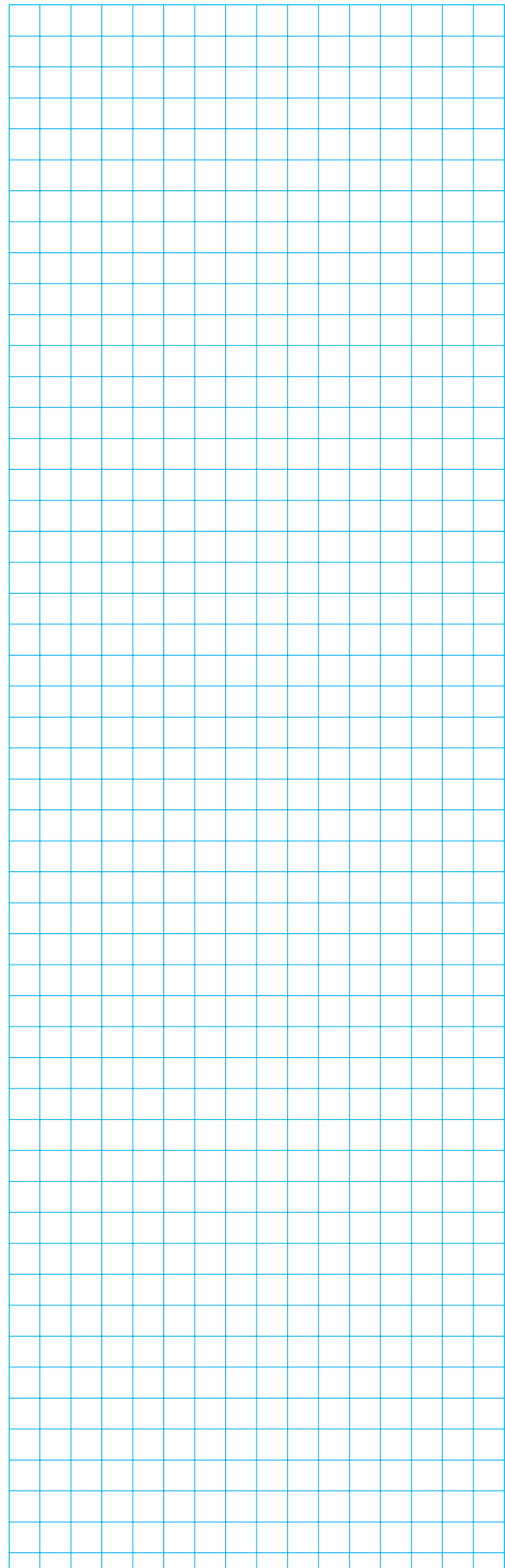
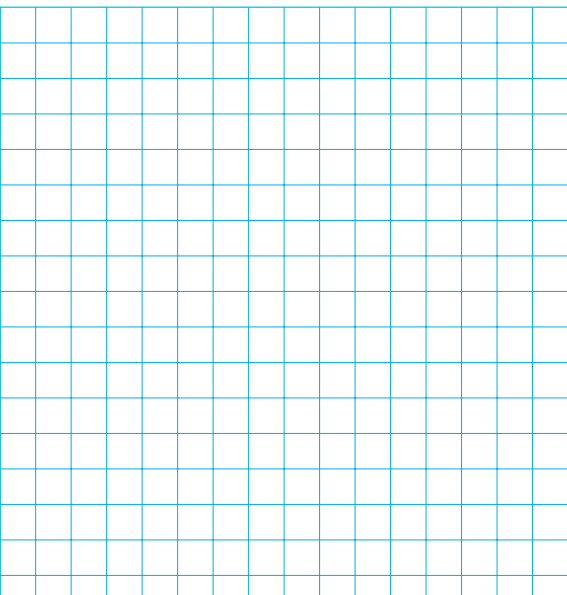




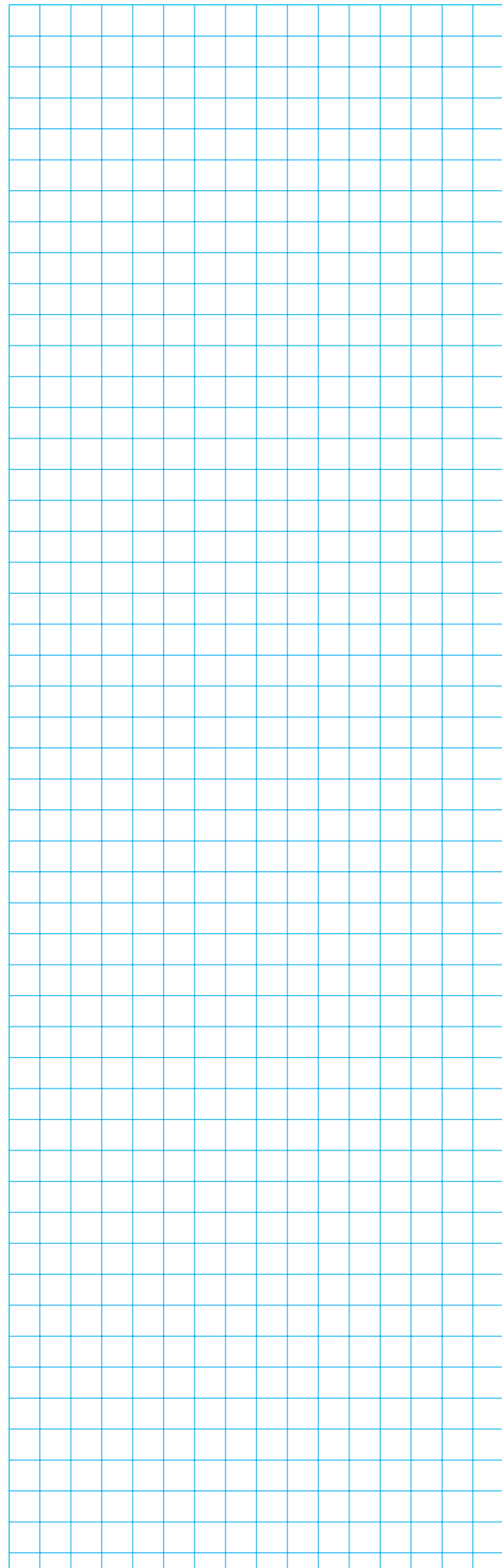
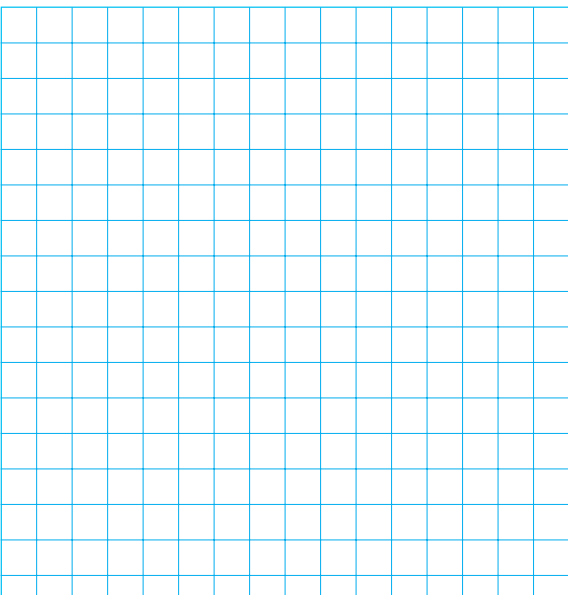
Figure 310

Install distributor sleeve.



Figure 311

Tap distributor sleeve into place.



Disassembly of impeller assembly



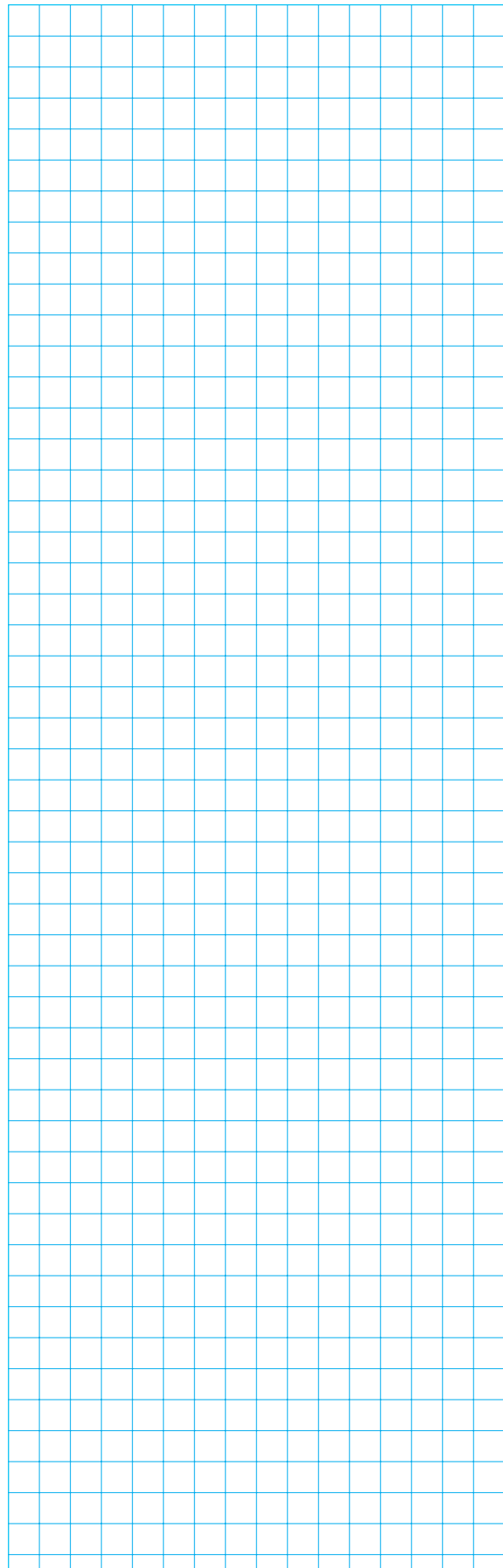
Figure 312
Remove impeller hub screws.



Figure 313
Remove impeller hub screw lock plates.



Figure 314
Impeller hub and o-ring removed.



Reassembly of impeller assembly



Figure 315
Position a new o-ring on impeller hub.



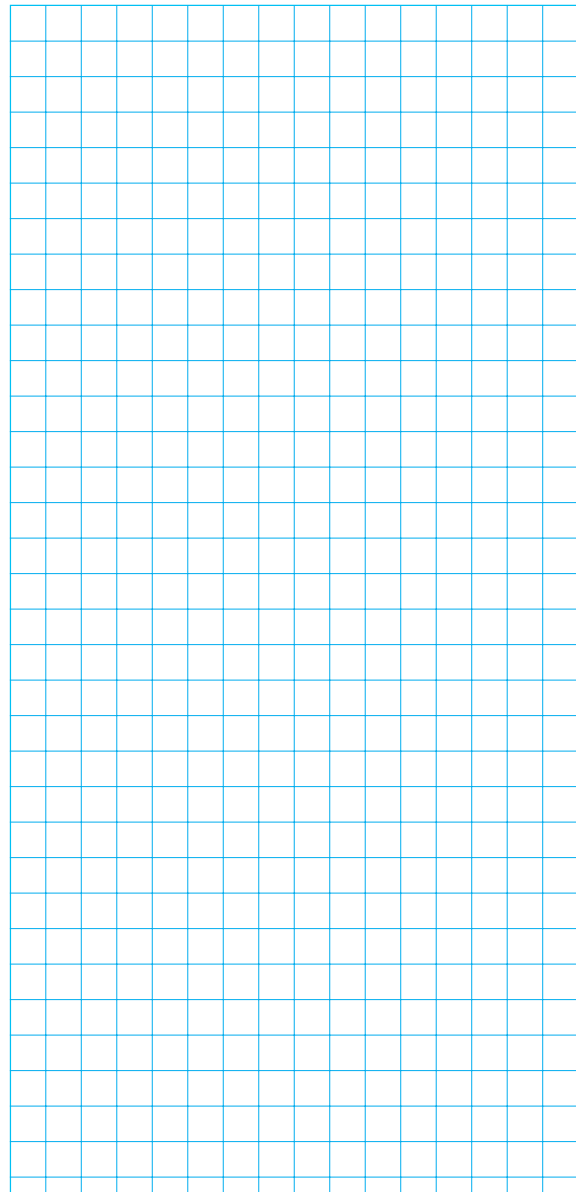
Figure 318
Tighten impeller hub bolts to specified torque.



Figure 316
Install impeller on hub. Align hub bolt holes with holes in impeller.



Figure 317
Using new lock tabs and bolts; start bolts in impeller hub.



Disassembly of impeller cover and turbine assembly



Figure 319
Pry turbine from impeller cover.



Figure 320
Remove turbine hub screws.



Figure 321
Remove turbine hub and backing ring from turbine.

Reassembly of impeller cover and turbine assembly



Figure 322

Install turbine on hub. Align hub bolt holes with holes in turbine.



Figure 325

Spread impeller cover bearing ring. Install bearing and retainer washer.



Figure 323

Install turbine hub backing ring and new bolts.



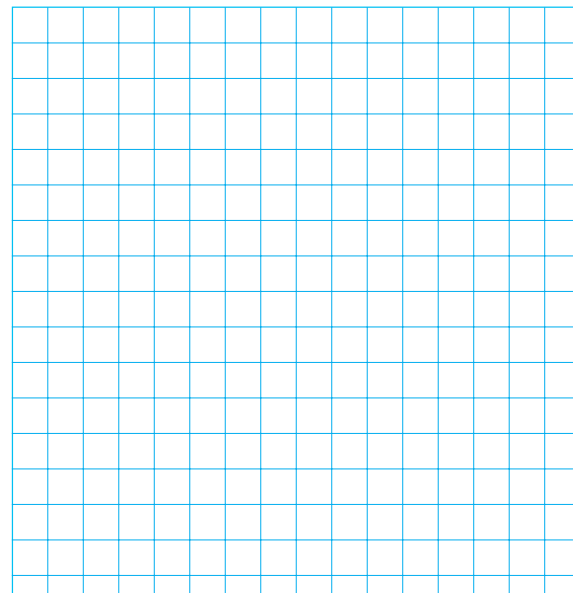
Figure 326

Position turbine in impeller cover and tap into place. Install new impeller cover o-ring.



Figure 324

Tighten turbine hub bolts to specified torque.



Disassembly of freewheel



Figure 327

Remove freewheel assembly retainer ring.



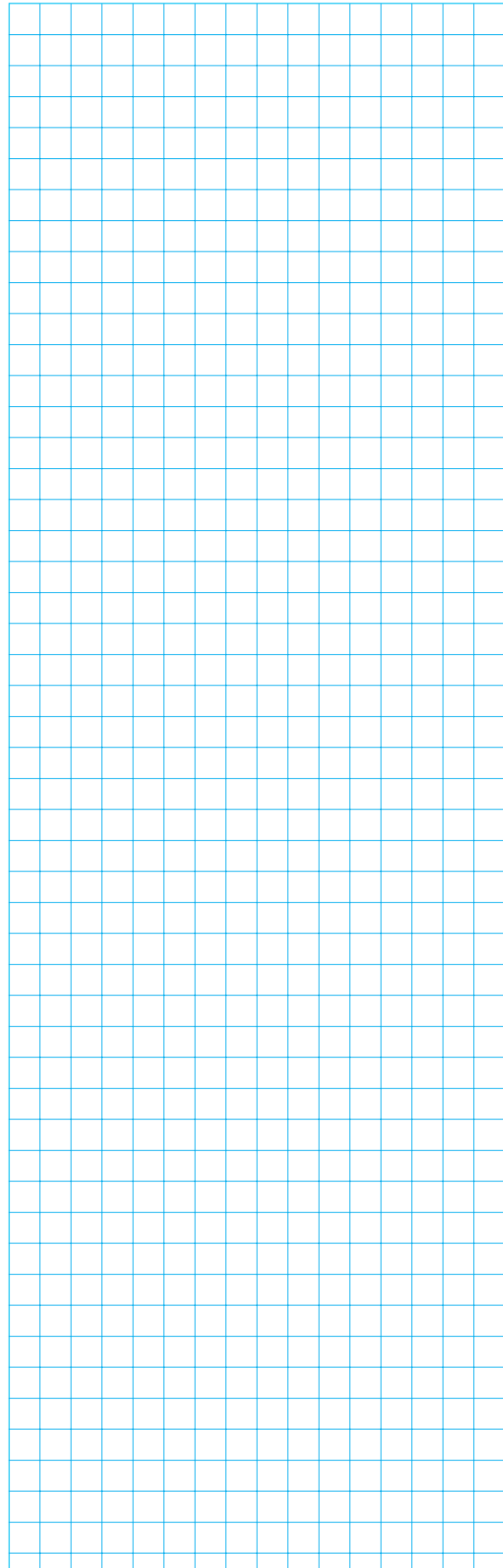
Figure 328

Remove freewheel assembly from reaction member.



Figure 329

Remove freewheel assembly retainer ring.



Reassembly of freewheel



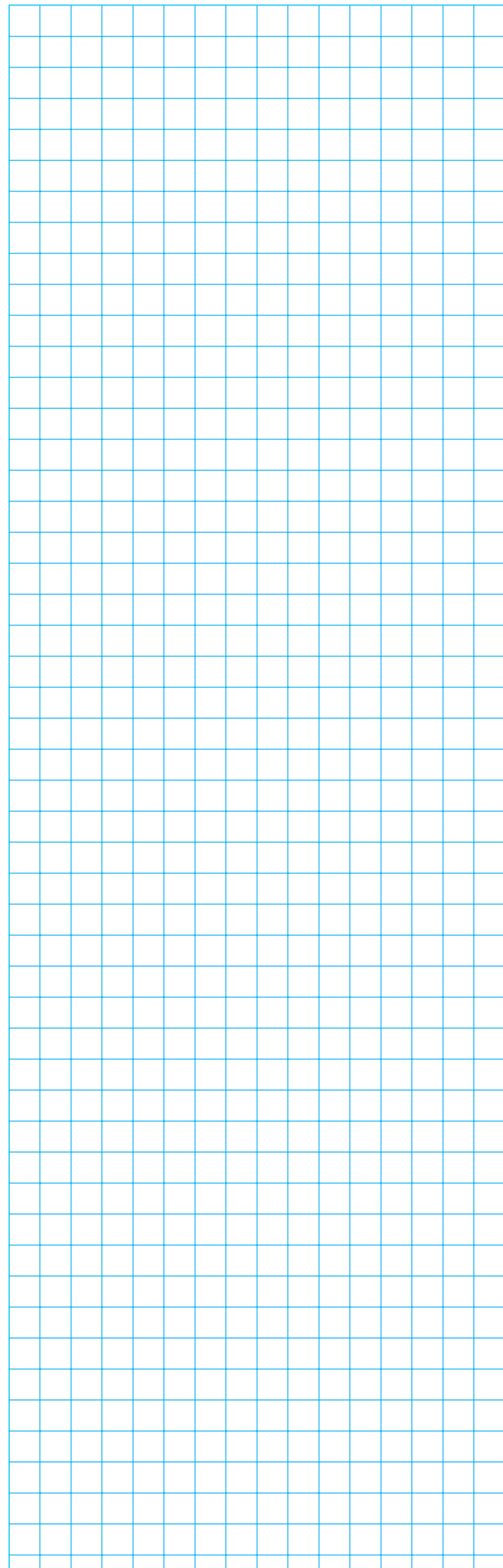
Figure 330
Install freewheel retainer ring.



Figure 331
Install freewheel.



Figure 332
Install freewheel retainer ring.



Reassembly of transmission case



Figure 333
Install oil baffle.



Figure 336
Install suction tube screws and lockwashers. Tighten screws to specified torque.



Figure 334
Install oil baffle screws and lockwasher. Tighten screws to specified torque.



Figure 337
Install output shaft front bearing inner retainer ring.



Figure 335
Install suction tube and o-ring.



Figure 338
Install front output shaft.



Figure 339
Tap output shaft front bearing into place.



Figure 342
Tap the seal with the lip into a depth of .25 (6,4 mm).



Figure 340
Install front bearing outer retaining ring.



Figure 343
Install forward drum rear bearing with bearing locating ring toward the front.



Figure 341
Apply a light coat of permatex # 2 to the outer diameter of the front output oil seal.



Figure 344
Align clutch oil sealing ring sleeve with notch in case. Tap sleeve into position.



Figure 345
Install sleeve retainer ring.



Figure 348
Install clutch gear retainer ring.



Figure 346
Tap forward clutch into sleeve and rear bearing. Use caution as not to damage sealing rings.



Figure 349
Tap low clutch assembly into position.



Figure 347
Install forward high clutch hub and gear on forward clutch shaft.



Figure 350
Install output shaft drive sleeve.



Figure 351
Install output shaft and 3rd clutch.



Figure 354
Install the low clutch rear bearing with the bearing locating groove to the rear.

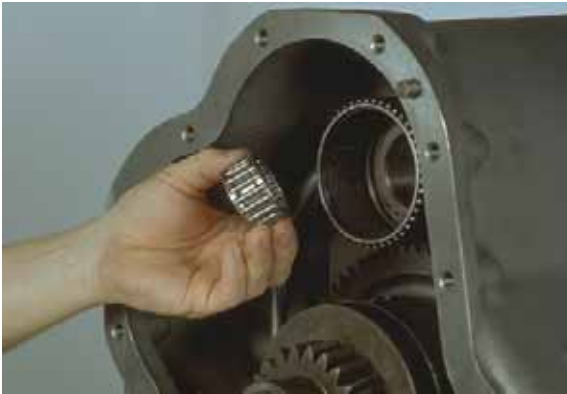


Figure 352
Position forward high clutch front pilot bearing.



Figure 355
Install the low shaft rear bearing spacer.



Figure 353
Position the forward high clutch drum assembly in pilot bearing. Use caution as not to damage pilot bearing.



Figure 356
Install low shaft rear bearing retaining ring.

Reassembly of transmission case



Figure 357

Position a new gasket and o-rings on rear of case. A light coat of grease will hold gasket into place.



Figure 360

Install rear cover bolts and lockwashers, tighten screws to specified torque.



Figure 358

Install forward high drive shaft.



Figure 361

Install dipstick tube and o-ring.



Figure 359

The use of aligning studs will facilitate rear cover installation. Tap cover into place.



Figure 362

Install dipstick tube mounting nuts and lockwashers. Tighten nuts to specified torque.

Reassembly of transmission case

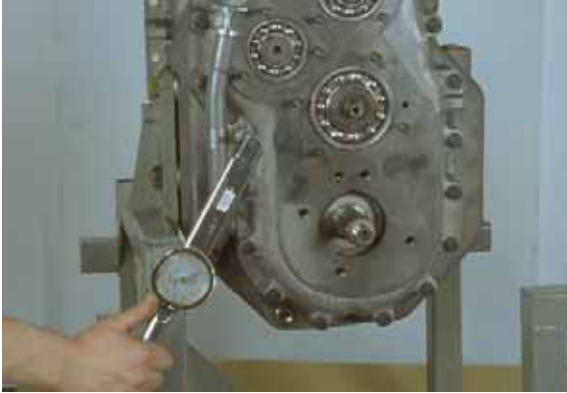


Figure 363

Install dipstick tube clip screw and washer. Tighten screw to specified torque.



Figure 366

Tighten output shaft nut : 200 to 250 Ft.Lbs torque. (271,2 - 338,9 N.m).



Figure 364

Install output shaft rear bearing.



Figure 367

Install output shaft rear bearing cap and new gasket.



Figure 365

Install output shaft rear bearing bushing washer and nut.



Figure 368

Install output shaft rear bearing cap crew and lockwasher. Tighten screws to specified torque.

Reassembly of transmission case



Figure 369
Install low clutch rear bearing locating ring.



Figure 372
Install forward high drive shaft rear bearing locating ring.



Figure 370
Position new o-rings on the low clutch rear bearing cap.



Figure 373
Position new gasket on the forward high drive shaft rear bearing cap.



Figure 371
Install bearing cap, washers and stud nuts. Tighten nuts to specified torque.



Figure 374
Install bearing cap, nuts and lockwasher. Tighten nuts to specified torque.

Reassembly of transmission case



Figure 375
Install forward high clutch rear bearing locating ring.



Figure 378
Position pilot bearing into low clutch drum.



Figure 376
Position new gasket on the forward high rear bearing cap.



Figure 379
Position reverse and 2nd speed clutch on disc hub aligning splines of disc hub with internal teeth of 2nd speed clutch friction discs. Disc hub must be in full position with friction discs. Do not force this operation.



Figure 377
Install bearing cap, nuts and lockwashers. Tighten nuts to specified torque.



Figure 380
Position new o-rings and gasket on front of transmission housing. A light coat of chassis grease will hold o-rings and gasket into place.

Reassembly of transmission case



Figure 381

Position pilot bearing on forward clutch shaft.

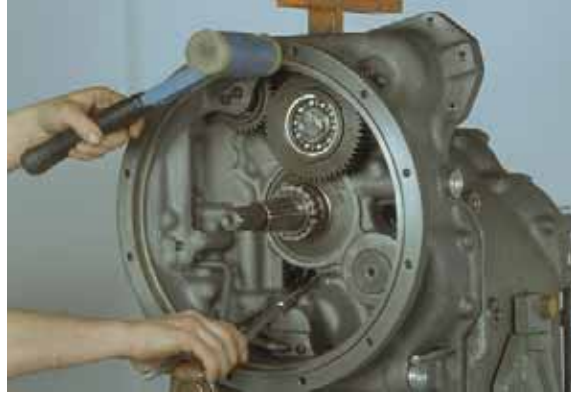


Figure 383

Spread ears on the reverse clutch front bearing snap ring. Lock pliers open to hold snap ring open. Tap converter housing in place. Use caution as not to damage reverse clutch front piston ring. Note aligning stud.



Figure 382

The use of two aligning studs will facilitate aligning the converter housing to the transmission housing. Install converter housing assembly to transmission assembly using extreme caution as to align the clutch pilots into the clutch disc hubs. As the clutch pilots enter the disc hubs turn the turbine shaft and output shaft back and forth.

This will help align all of the clutch inner discs with the disc hubs.

DO NOT FORCE THIS OPERATION.



Figure 384

Install a capscrew in the front and one in the rear of the converter housing and snug up but do not tighten. This will hold the converter housing to the transmission housing. Using a hook type hammer puller as shown pull the reverse clutch gear toward the front of the converter housing. This will move the reverse and 2nd clutch assembly forward to align the snap ring groove in the bearing with the snap ring in the housing. Being certain bearing snap ring is in full position in snap ring groove, remove pliers.

Reassembly of transmission case



Figure 385

When all the clutches are properly aligned, the converter housing will be tight against the transmission housing. Install two housing to housing capscrews and lockwashers. Remove aligning studs. Install remaining capscrews and lockwashers. Tighten caps crews to specified torque.



Figure 388

Position impeller hub bearing spacer on stator support.



Figure 386

Apply a light coat of permatex form -A- gasket *6 to O.D. of oil baffle or converter bore in converter housing. Remove immediately any excess sealant that could enter the oil circuit. Assembly new oil baffle oil seal in baffle. Position oil baffle puller screw holes 15° to 30° either side of vertical center line. Tap baffle into position until baffle shoulders in converter housing.



Figure 389

Install reaction member.



Figure 387

Install impeller and hub assembly using caution as not to damage the baffle oil seal.



Figure 390

Install reaction member retaining ring.

Reassembly of transmission case



Figure 391
Install turbine locating ring.



Figure 394
Install turbine retainer ring.



Figure 392
With a new impeller cover to impeller o-ring in place, install turbine and impeller cover assembly on turbine shaft.



Figure 395
Position new o-ring on impeller cover bore plug. Lubricate ring to facilitate reassembly. Install plug in cover.



Figure 393
Install impeller cover to impeller washers and bolts. Tighten bolts to specified torque.



Figure 396
Install bore plug retainer ring.

Reassembly of transmission case



Figure 397
Install front output flange, o-ring, washer and nut.



Figure 400
Tighten stud nuts and capscrews to specified torque.



Figure 398
Use a flange retainer to prevent flange from turning and tighten nut 200 to 250 Ft.Lbs. torque. (271,2 - 339-9 N.m).



Figure 401
Install new oil filter cartridge.
Note: It is recommended that the filter cartridge be changed after 50 to 100 hours of operation on new and rebuilt or repaired units.



Figure 399
Using a new gasket and o-ring, position charging pump assembly on studs. Install washers, nuts and capscrews.



Figure 402
Position new gasket and install pump adaptor.

Reassembly of transmission case



Figure 403

Install pump adaptor screws and lockwashers. Tighten screws to specified torque.

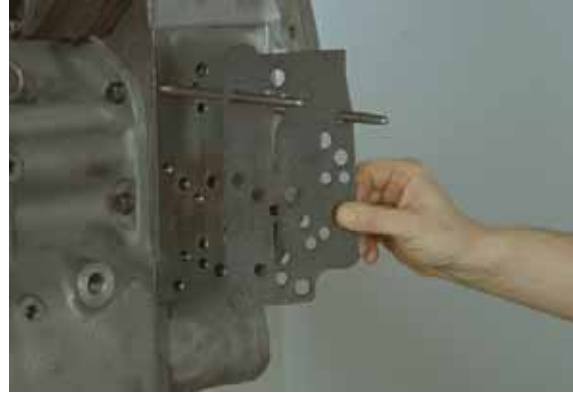


Figure 406

Place a new valve gasket on housing.
Note: The use of aligning studs will facilitate valve installation.



Figure 404

Position new gasket. Install pump hole cover.

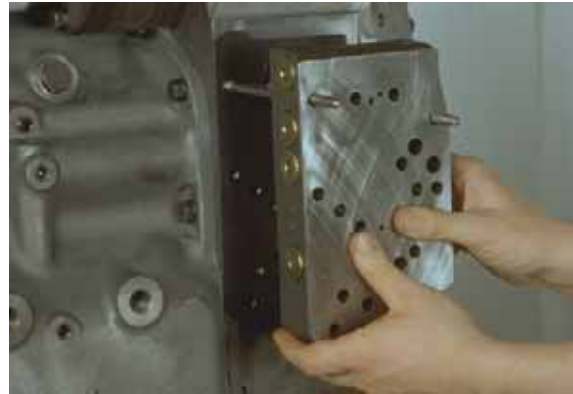


Figure 407

Install modulation valve assembly.



Figure 405

Install cover screws and lockwashers. Tighten screws to specified torque.



Figure 408

Install new control valve gasket.



Figure 409
Install control valve assembly.



Figure 412
Install drive plate screws and lockwashers. Tighten screws to specified torque.



Figure 410
Install control valve screws and lockwashers. Tighten screws to specified torque.



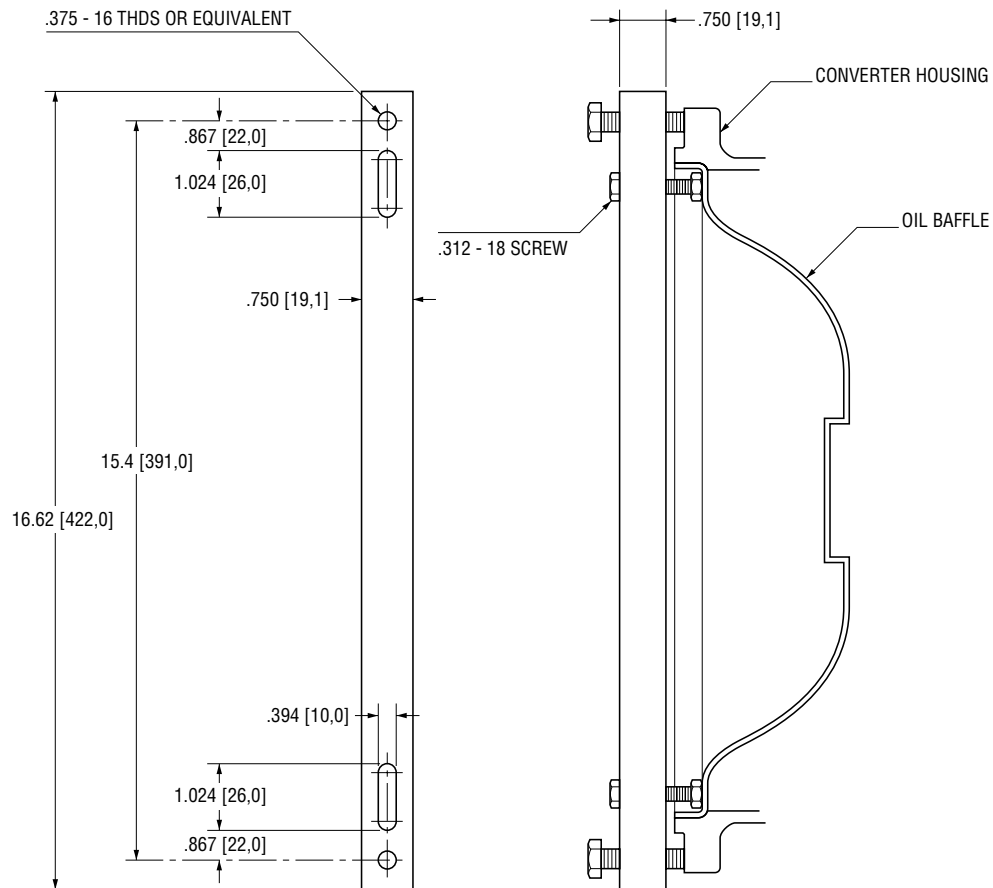
Figure 413
Overall view of the transmission.



Figure 411
Install drive plates.

SERVICE TOOLS

1. OIL BAFFLE PULLER



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